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Faulty Communications

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NO MUSCLE in the body will serve the brain unless the communicating nerve is functioning. Some of the most insidious diseases are those affecting the organs of communication. So, in a military organization, accurate communications spell the entire difference between well-ordered, directed effort and blundering, misdirected force or complete paralysis.

It would perhaps be an exaggeration to say that naval operations in the World War suffered from locomotor ataxia. Rather should the comparison be with the nerve system of a growing infant, just learning to coördinate muscle and brain. For the first time in the history of naval warfare every vessel, in whatever quarter of the globe, was normally in prompt and usually immediate communication with the Admiralty and with its fellows. In little more than a decade we had reached this astounding development from a period when all communication depended on being at the end of a cable, within visual distance, or where a dispatch boat could deliver a message. Small wonder that training and experience had not kept pace with the possibilities of the new situation.

Certain it is, however, that a study of faulty communications in connection with naval operations is practically a review of the entire war. There was scarcely a major operation in which some failure of communication did not play an important, if not a decisive part. There seems even to be a connection between the importance of the occasion and the lack of success, until at Jutland the repeated failures to get a correct, intelligent, and comprehensive idea from the mind of one man to the mind of another assumed almost incredible proportions.

We must be prepared, therefore, to review well-known history and to thresh over much old straw, with the object, however, of bringing to light the one element of faulty communications and of emphasizing the effect of this single element upon the course of events.

A man has in his mind an idea, which may be a piece of information, a question he wishes to ask, or something he wants done. He may, particularly in the case of information, neglect entirely to communicate it to another to whom it should be given. If he attempts to communicate it he may do it in such language or in such a manner as not to produce in the mind of the recipient the same idea or the same picture that is in his own mind. This may be the result of ambiguous language or it may be a lack of appreciation of the different viewpoint of the recipient due to the situation of the latter and the information which he does not already possess. Lastly, the sender may act with perfect intelligence but his message may be hampered by an inadequate code or signal book or may go astray through failure of connecting links, either human or material.

All these are faulty communications. They should be sharply distinguished from

correct communication of faulty information. Beatty's delay in ordering Evan-Thomas to turn when the latter's battleships were driving head on to the main German fleet may be classed as faulty communication of the negative type, but Beatty's sending Jellicoe an incorrect position of his flagship was not a fault in communications. It is only when an idea present in one mind fails to reach another that communications have failed to function.

We must likewise distinguish and exclude any discussion of indoctrination as a substitute for communications. It would doubtless be an ideal state of affairs if, with the situation apparent to all, every subordinate commander should proceed to do the right thing at the right time with no orders whatever. Training with this end in view is doubtless invaluable. When, however, previous training has been such that no dependence whatever can be placed on such initiative, the commander in chief must be presumed to know the limitations of his command and cannot be absolved from his failure to give timely, adequate, and intelligible signals.

The three main types of faulty communications are: first, failure to communicate information which should be sent; second, failure to convey an idea accurately; third, failure of material means of communication.

Out of a wealth of illustrative material the present article deals only with three outstanding examples, the escape of the *Goeben*, Dogger Bank, and Jutland. Of the many episodes thus necessarily omitted particular mention should be made of the action off Heligoland Bight, which, as a classic example of sketchy information, ambiguous orders, and general lack of intelligent communications, would repay more detailed treatment.

ESCAPE OF THE *Goeben*

At the outbreak of the war Great Britain had in the Mediterranean three battle cruisers, four armored cruisers, four light cruisers, and a flotilla of destroyers. The chief concern of the Admiralty in that quarter was the safe transport of a French army corps from North Africa to France. The French had advised that this movement was to be begun immediately and undertaken without convoy. Their covering force seemed adequate to deal with any possible enemy with the single exception of the formidable *Goeben*, a battle cruiser faster and more powerful than any single unit in the French or British fleets.

On July 30, five days before England declared war, orders covering various political contingencies had been sent Sir Berkeley Milne, the British commander in chief. These included the following instructions:

> Your first task should be to aid the French in the transportation of their African army by covering and if possible bringing to action individual fast German ships, particularly *Goeben*, which may interfere with that transportation.

The substance of this was reiterated in the succeeding days:

> *Goeben* is to be prevented by force from interfering with French transports.
>
> If *Goeben* attacks French transports you should at once engage her.

On the night of August 5, Admiral Milne had accurate information that the *Goeben* was coaling at Messina. On account of Italy's neutrality, he had direct orders not to approach within six miles of the Italian coast, and therefore could not enter the straits. Admiral Troubridge, with four armored cruisers, was under orders to guard the mouth of the Adriatic. Milne's immediate force was the three battle cruisers, *Inflexible*, *Indomitable*, and *Indefatigable*, with two light cruisers, and one division of destroyers. The cruiser *Gloucester* was watching the southern entrance to the strait and the *Dublin* was coaling at Malta. On the battle cruisers rested the main chance of catching the *Goeben*.

Under these circumstances Milne kept all three of his capital ships to the westward of Sicily. The *Indomitable* needed coaling, and he sent her to the nearby port of Biserta. If she had been sent to Malta she would have been in position to guard against a breakaway to the south and east. In view of the critical movement of troops, however, and of the insistence of his orders, and in view of the fact that he must intercept a faster vessel than any of his own, the admiral was undoubtedly right in keeping all three of his battle cruisers between the enemy and the precious stream of French transports.

But there was no precious stream of French transports. Two days previously Admiral de Lapeyiere had changed his mind, had postponed the sailings and was organizing convoys. All the British dis-

positions were based on a set of conditions that were non-existent.

Winston Churchill comments as follows:

> Sir Berkeley Milne had not, however, succeeded in communicating with the French admiral, although he had made repeated attempts by wireless. . . . . He did not know where the French fleet or the French transports were. He did not tell the Admiralty this. The Admiralty for their part, after the general telegram of August 4, enjoining immediate consultation with the French, assumed that the two commanders-in-chief in the Mediterranean were acting in concert. They did not, therefore, ask the French for any information, nor was any volunteered by the French Admiralty. An inquiry addressed to Paris would have elicited the fact that the French had changed their plans and that no transports were yet at sea. All parties were on this point to some extent at fault.

As to which there can be no dissent. More of the same sort, however, was to follow. Upon leaving Messina the *Goeben* broke away to the southeast, dogged and reported on by the *Gloucester*. As soon as it became apparent that this was not a feint, Troubridge, with four armored cruisers and some destroyers, hurried south from the Adriatic to intercept him. Troubridge was quitting an important post without orders, but notified his superior by wireless. He hoped to catch the *Goeben* at night, when the German's superior range would be less effective.

About four o'clock the next morning, however, Troubridge changed his mind. He had heard nothing from the commander in chief, either by way of orders or reply, in response to the message that he was leaving his post. He found that he could not close the *Goeben* during the night. For a daylight action he decided that his force was inferior to that of the enemy and he had received orders before the beginning of hostilities not to be brought into action by a superior force. He therefore turned about and went back to watch the mouth of the Adriatic.

Without one further fact all this would be a matter of judgment in the field of operations. The further fact is that after the escape of the *Goeben* had become a reality, Sir Berkeley Milne registered strong disapproval of the action of his subordinate in turning back. If, as we assume, this was not merely a belated afterthought, but represented his judgment at the time, it brings the matter back to a question of faulty communications.

The commander in chief knew the entire situation. From his hopeless stern chase with his battle cruisers he was in communication with the daring *Gloucester*, which had the *Goeben* in full view. Why no orders to Troubridge to come south? Why no acknowledgment nor approval of the latter's notification that he had quit his post to do so? From the other end, why did Troubridge not attempt to communicate his change of plans in the early morning? We easily assume that our new magic has become commonplace and that we use it as naturally as we talk, but here there is no better explanation than lack of training in the importance of full communication.

There is another angle of faulty communication in Troubridge's orders not to be brought into action by superior force. These were the Admiralty's original orders to Milne, given before England declared war, and while the whole political situation was in flux. As given in full by Churchill, the context shows that they dealt with the whole strategic situation, particularly in view of the possibility that Austria, or even Italy, might be at war with England from the outset. Milne apparently repeated the orders down the line, whereupon they became binding on a portion of his force in a tactical situation which called for risk to be taken.

The lesson of this is that a parrot-like repetition of orders is frequently faulty communication, as the orders may have a different bearing and effect due to the different background against which they are projected.

There is a poem of the trenches, wherein a series of military communications, from a sergeant up to the commanding general and back, is carried on in elaborate whispers, because, as it finally turned out, the sergeant had a cold. The tale has moral as well as humor. In the present case Milne's repetition of his own orders not to be brought into action by superior force, which had referred to his entire command and to entirely different circumstances, not only returned to plague him but furnished complete exoneration for Troubridge in the court-martial which followed.

Thus the whole incident of the escape of the *Goeben* may be stated in terms of faulty communications. The excuse for so recasting the familiar story is that while the facts are writ large in every account very little emphasis is put on the communication fea-

ture. Thus Churchill, in his summary says:

> The terrible "Ifs" accumulate. If my first thoughts on July 27 of sending the *New Zealand* to the Mediterranean had materialized—if we could have opened fire on the *Goeben* during the afternoon of August 4—if we had been less solicitous for Italy's neutrality—if Sir Berkeley Milne had sent the *Indomitable* to coal at Malta instead of Biserta—if the Admiralty had sent him direct instructions when on the night of the fifth they learned where the *Goeben* was—if Rear Admiral Troubridge in the small hours of August 7 had not changed his mind—if the *Dublin* and her two destroyers had intercepted the enemy during the night of the sixth and seventh—the story of the *Goeben* would have ended here.

As thus stated, every fault is one of judgment or of chance. As the precise situation will never recur there is only a remote and general lesson for avoiding similar mistakes. Let us, however, summarize the mistakes in terms of faulty communications.

If the French had notified their ally of their change of plans regarding transport, if the British Admiralty had thought to inquire, if Admiral Milne had been able to get into direct communication with the French as ordered, if he had notified his own Admiralty of his inability to carry out this order, if he had ordered Troubridge to do what he afterwards said he wanted done, if he had acknowledged and confirmed Troubridge's first move in this direction, if Troubridge in turn had notified him of his contemplated abandonment of this movement, the story of the *Goeben* might have ended here.

Restated in this form there is hope that War College or staff training in the full and accurate use of all means of communication will avoid similar mistakes in the future.

DOGGER BANK

Five British battle cruisers are steaming southeasterly at full speed across the North Sea. Ahead on their port bow three German battle cruisers are racing for safety. A fourth vessel, the *Blücher,* battered by continuous pounding, has dropped well astern, and is clearly doomed. One of the British ships, the *Indomitable,* is also somewhat astern, being unable to keep the terrific pace. The five British ships within range of the Germans are attempting to distribute their fire equally down the line. The Germans for the most part are concentrating upon Beatty's flagship, the *Lion,* leading the line.

We may let Beatty tell his own story of the critical moments that followed. The quotations are from his own dispatch, before it was edited, mutilated, and published by the Admiralty. Of the following paragraphs numbers 16, 19 and 20 were omitted entirely in the official publication and the others somewhat changed.

> 16. From 10:00 A.M. onwards, *Lion* suffered considerably from the concentrated fire of the enemy's two leading ships, and two alterations of one point inwards were made accordingly, ships turning together. *Lion* then zigzagged to throw out the enemy's range. About 10:40 A.M. *Lion* received heavy punishment. By 10:51 her port engine was stopped, all lights were out, she was making water rapidly, listing heavily to port, and was unable to maintain her place in the line.
>
> 17. At 10:48 A.M. the *Blücher,* which had dropped considerably astern of enemy's lines, hauled out to port, steering North, with a heavy list, on fire, and apparently in a defeated condition. I consequently ordered *Indomitable,* which was astern, to attack enemy breaking to the northward.
>
> 18. At 10:54 A.M. submarines were reported on the starboard bow, and I personally observed the wash of a periscope, 2 points on our starboard bow. I immediately signalled "Turn 8 points to port together"—this signal was hauled down at 11:00 A.M. As this turn would take us across the track of enemy destroyers, it was important that it should be sufficiently large to take us clear of it before we reached the position they were in at this moment so as to avoid the mines which they would probably take the opportunity of dropping. *Indomitable* subsequently reported that a torpedo had been fired at her, crossing her bows 40 yards ahead after leaving the vicinity of the sinking *Blücher*—so it may be assumed that the enemy submarines had closed and attacked her.
>
> 19. It was now clear that *Lion* could no longer remain "Guide" of the Fleet, and as our zigzagging might have caused doubt as to the actual course to be steered, I hoisted the signal "Course N.E.," at 11:02 A.M. This course would have cut the enemy battle cruisers off from the *Blücher* should they turn to support her, as I anticipated they would. Should they leave her to her fate, our ships could have again turned to a parallel course when clear of track of their torpedo craft.
>
> 20. At 11:05 A.M. I hoisted the signal "Attack the enemy's rear," hauled down the course signal, and hoisted "Keep nearer to the enemy." At this time *Lion's* wireless apparatus was out of action and only two signal halliards remained, preventing me from informing Admiral Moore of the reason for my sudden 8-point turn or from exercising any further command. I kept the signals "Attack the rear" and "Keep closer" flying till the remainder of the squadron had passed out of sight.

How all this registered in the minds of those to whom it was supposed to convey ideas may also be quoted, this time from Corbett's official history:

> Unhappily the signals were very difficult to read. As the wind was, the flags blew end on to the other three battle cruisers, and the first of the two signals seems to have been hoisted before

the compass signal "Course N.E." had been hauled down. The result was that the Rear Admiral concluded that his Chief was ordering the squadron to "attack the enemy's rear bearing N.E.," that being the meaning of the flag groups as they were seen from the *New Zealand*, as well as from the *Tiger*, and *Indomitable*, who both logged the signal in the same terms. The misunderstanding would, in all probability, have been cleared up by the Vice-Admiral's final signal "Keep closer to the enemy"; but none of the battle cruisers took it in. The *Blücher*, which bore about N.E. from the *New Zealand*, was therefore taken to be the objective indicated, both by the eight-point turn made at 11:00, and the signals subsequently received. The *Tiger* and *Princess Royal* at once ceased firing on the *Derfflinger* and *Moltke*, and edged off to starboard to circle round the *Blücher*. Thus the German battle cruiser squadron, half beaten as it was, was left alone. The luck which had snatched the Germans from our grasp at the time of the Scarborough raid stood by them and, for the second time, gave them a means of escape.

It is evident that in a few minutes Beatty had run the gamut of faulty communications. He said too much, he said too little, what he did say he said obscurely, and he had imperfect tools with which to work.

Beatty's first sin of omission was in not hoisting a submarine warning signal, when he was convinced that he had seen a periscope. This would have conveyed the situation as it existed in his mind to the minds of his captains. If they were supposed to have any judgment or responsibility for their individual ships they were entitled to the information. Incidentally, it would have made intelligible the blind signal that followed, the mystery of which was the principal cause of the confusion that followed.

The responsibility for the next error in communication lies between Beatty and the man who made the signal book. Assuming that Beatty used the best signals available they were decidedly ambiguous. When he hoisted two flags, described as "Compass B," and stated by all the historians to mean "Course northeast," he wanted something definite done. He wanted his ships turned to and steered on that course. This hoist, however, simply because other flags were hauled up before it was hauled down, meant and was logged by every ship merely as "bearing northeast." Any idea of action had gone out of them.

The compiler of the book had apparently economized by making a simple compass direction mean action in one connection and a mere bearing in another. The economy proved expensive.

It is not at all certain, however, that Beatty used the best language at his command. Admiral Bacon comments on the incident as follows:

> Admiral Beatty used the Blue pendant for the eight point turn to N. by E. This meant that all the ships were to turn at the same moment. This was correct. But when he turned back the three points to N.E. instead of using the Blue pendant again, like any experienced admiral would have done, he used the compass pendant, which either signifies a course to be steered, or if hoisted with another signal it shows the bearing of the object talked about in the signal.*

Whether Beatty's choice was at fault or not, the ambiguity of the signal actually used is apparent.

The failure to relinquish command may be regarded as merely an error in judgment, and so not within the scope of the present study, yet in one aspect it was a matter of faulty communications. Beatty knew the state of the *Lion*. Rear Admiral Moore, on the *New Zealand*, did not. According to Beatty's own account his ship had been unable to maintain its place in the line for over ten minutes and was no longer a safe guide. He might have found flags to say, "Assume command," or, "Disregard movements of commander in chief." He preferred to keep his second in command guessing as to the meaning of his various signals not only during, but beyond the time he was within effective signaling distance.

Admiral Moore could not know at just what moment he was supposed to exercise his own responsibility and the very act of his superior in making signals after they could be read tended to deprive the new commander of all initiative.

The last signal made which could be read was extremely ambiguous. Why attack "the rear" of the enemy? This was also a two flag hoist, the letters being A. F. If the signal book was at all typical Beatty must have gone down through some such list of phrases as "Attack," "Attack the enemy," "Attack the van of the enemy," "Attack the center of the enemy," before arriving at the unfortunate phrase, "Attack the rear of the enemy."

One still wonders what Beatty had in mind in the choice of this language. The unfortunate *Blücher* was still the rear of the enemy and this was the disastrous interpretation actually put on the order. If the *Blücher* was temporarily out of Beatty's

* Bacon, *The Jutland Scandal*, p. 143.

mind, did he mean to direct the attack particularly on the *Moltke*, now the last ship in the active squadron? The British had just had the entire German line under fire and had been trying to follow their customary doctrine of keeping every ship engaged. No wonder that this sudden emphasis on "the rear" should have bewildered the officer called on to execute the order.

The last order was never read, but it is doubtful if it would have improved the situation. It was Nelson's last signal at Trafalgar: "Keep closer to the enemy." This may have had the Nelsonian touch of 1805, but as applied to battle cruisers doing twenty-seven knots and caught in the middle of a complicated evolution, it lacked clarity and directness.

Independently of any errors of judgment, therefore, it is apparent that errors in communication, that is, the neglect or inability to convey information and orders in an intelligible form, were the decisive factors in the escape of the three German battle cruisers.

Jutland—The Battle Cruisers

At Jutland, faulty communications began early and continued in increasing volume until the end. It must be repeated that in the rehearsal of many of the familiar details there is no reference to errors of judgment which may have contributed to the result. These are deliberately omitted. Only those events are referred to in which enters the element of faulty communication, the object being to determine how far the one factor of lack of intelligible transmission of an idea, an order, or the facts of a known situation may have contributed to the unsatisfactory result.

When the light cruisers first made contact Beatty had just turned northward. Five miles to the N.N.W. was his supporting squadron of fast battleships. Beatty turned S.S.E. toward the enemy, but made his signal by flag, distinguishable only to his own battle cruisers. Precious minutes were lost before Evan-Thomas, now directly astern, acted on the obvious necessities of the occasion and followed his lead. The same thing happened when Beatty, still seeking the main force of the enemy, turned east and northeast. The battleships followed, cutting the corners as best they might. Finally the *Tiger*, the fourth in line, actually reminded the flagship that no signals for the last half hour had been passed on to the battleship squadron.

It is true that during all this preliminary phase Evan-Thomas had the intercepts from the wireless signals of the light cruisers and therefore knew the general situation. Whether he should have turned more promptly toward the enemy without receiving orders is a question of initiative and indoctrination. There is no evidence that Beatty's repeated failure to signal was based on any assumption that signals were not needed. If so, the first delay would have been a warning that his confidence was misplaced.

By this time the battle cruisers had sighted each other. With the reminder of the *Tiger*, Beatty used his searchlight to send an intelligible signal to Evan-Thomas, ordering the battleships to turn east at twenty-five knots. Then he promptly forgot them again. He himself received word from a seaplane that Hipper had turned south, and altered his course to E.S.E., then as the engagement opened, to S.S.E., and finally to south. Not a word of this went back to the battleships. Seven miles astern, with his chief's movements now hidden by the smoke, Evan-Thomas still held on to eastward.

It was not until Evan-Thomas sighted the German battle cruisers that he discovered that Beatty had turned south. Considering that even now he turned up within extreme range of 19,000 yards and soon straddled the *Von Der Tann*, it is easy to imagine that with intelligent directions from the outset he would either have smashed the rear of the German line or would have driven Hipper far to the eastward.

In the battle cruiser line the signals for distribution of fire had all gone wrong but in the light of greater errors of omission and commission this seems almost a detail.

It must not be imagined that the air was left empty. On the contrary, messages, direct and intercepted, accumulated faster than the fighting captains found time to read them. Their pockets were stuffed full of them. Most of them were matters of detail, two-thirds of them were unimportant. It was decisive matters that were being delayed in transmission or missed entirely. In the crowded minutes of actual action it is almost as important to keep the air clear of confusing detail as it is to pick out the events which will tend to clarify the picture in the mind of the commander in chief.

On the German side, Admiral Hipper was far from giving his chief an accurate picture of the situation, and his failure had important results.

Upon plotting the southward run of the fighting battle cruisers, Admiral Scheer prepared a neat trap. He kept his battleships headed westward, so that Beatty was bound to run into a pocket between Hipper's battle cruisers and the main force. Which way Beatty would have turned can only be conjectured. Scheer was diverted from his purpose by signals from Hipper: first that he was heavily engaged with British battle cruisers; and then that five battleships (there were actually four) had joined in the engagement. Scheer felt obliged to abandon his trap and to turn north to the immediate rescue of his imperiled scouting force.

What Hipper did not report was that he had sunk two of his opponents, reducing their units from six to four, that Beatty was showing no inclination to come to close grips, and that the enemy battleships were engaging his rear at such long range that their shells, for some reason or other, were doing little damage. If the true picture had been conveyed to Scheer there is but little doubt that he would have held to his original dispositions.

The sinking of the *Indefatigable* and *Queen Mary* deserves a special niche in the hall of faulty communications. Scheer first learned of it the next day, and then from British prisoners rescued from the sea. Jellicoe also learned of it the next morning. It was as if, in a great land battle, two entire divisions of troops had been utterly annihilated and neither the victorious nor the losing corps commander had taken the trouble to notify the commanding general of the occurrence. Surely this will stand as a record for care-free suppression of vital information.

Returning to the heat of the great battle, Beatty's inadequate signals to his battleship squadron had one last consequence. Still on the southward run, he received word from his advance cruisers that he was headed almost straight for the German battle fleet and in a couple of minutes he verified this for himself. A prompt reversal of course was in order, and as usual was made by flag signal, invisible to his battleships, now eight miles astern. It was not until Evan-Thomas met the battle cruisers coming back that he was signalled to turn. As he was closing the German battle fleet at nearly a mile a minute he was almost abreast of the *Konig* before the turn could be completed. The *Barham* and *Malaya* suffered severely and the squadron remained under fire from the German battleships for a considerable period thereafter.

The next item on the long list we must quote from Corbett:

> Admiral Beatty's signal is a typical example of the difficulty of conveying accurate information in action. His own W/T having been shot away, he semaphored to the *Princess Royal*, his next astern, as he was turning north, "Report enemy's battle fleet to the commander-in-chief bearing S.E." The message she sent was entered in her log thus: "S.O. Battle Cruiser Fleet to commander-in-chief via *Princess Royal:* Urgent-priority. Have sighted enemy's battle fleet bearing S.E. My position Lat. 56° 36′ N. Long., 6° 04′ E." By some of the ships the message was taken in correctly. In the *Iron Duke* it read: "26-30 battleships probably bearing S.S.E. steering S.E." but in the light of the *Southhampton's* signal the enemy's course was rightly interpreted.*

The comment of the opening sentence does scant justice to the historian's power of analysis. The *Iron Duke* was not in action. The fact that other ships logged the message correctly showed that the ships in action had overcome the difficulty and that the entire fault lay on the bridge of the flagship miles away. More pertinent would be comment on the fleet training which found in this all-important position at this most crucial time an operator who so obviously bluffed a reconstructed message from one he failed to understand.

Jutland—The Night Action

Such mistakes as were made in the run northward and in the general engagement were for the most part not errors in communication. Failure to acquire information is not failure to transmit it, nor are we now concerned with the handling of ships. We may therefore pass to the events of the night, when the failure of communication reached its incredible climax.

Briefly, the entire German fleet, steering for a destination and on a course both absolutely known to the British Admiralty, fought its way through the massed torpedo flotillas and supporting cruisers placed astern of the British battle fleet especially to guard this contingency, losing a battleship, three cruisers, and two destroyers, while sinking a

* Corbett, Vol. III, p. 349.

British flotilla leader and four destroyers, all without Admiral Jellicoe knowing at any time where the German fleet was or what had occurred.

As the night closed down Jellicoe knew that the German battle fleet had last been seen retiring directly away from its base. He knew that it had its choice of three definite lines of retreat, the Ems, Heligoland, and Horn Reefs, with scant margin of time to make any one of the three before dawn. He knew that any authentic report of its position in the early hours of night would show which line had been chosen and would enable him to place his battleships athwart that entrance at daybreak.

For reasons that apparently seemed adequate to him, which no historian has professed to understand, he had charged no portion of his fleet with the duty of seeking contact or obtaining that information. Further than this, however, he had not indicated to his command any particular desire for this one vital item. All that his command knew was that he had headed them due south in a somewhat unusual formation. What else was in his mind they knew not. Some captains think; others obey orders. All, however, had been bred from infancy upon the immortal lines:

> Thee is not to make reply;
> Thee is not to reason why;
> Thee is but to do and die.

It was these lines that were to receive a modern but less glorious application.

It may be thought that a request to report the presence of battleships, emphasizing its importance, would be too obvious. The presence of all enemy ships is customarily reported, and particularly any engagement with them. That is just the trouble. The air had been full all day with the reports of cruiser and destroyer fights. There were to be visible manifestations all night of a continuation of such fighting. The commander in chief paid not the slightest attention to these. What he wanted was not the usual run of information but a special item, the location and course of the enemy battleships. He wanted particular attention and alertness to distinguish this one particular fact. He should so have informed his fleet.

The British Admiralty now comes into the picture with a typical case of faulty communication. From intercepted and decoded messages they learned that Admiral Scheer had called urgently for an airship reconnaissance off Horn Reefs in the early hours of the morning and that he had ordered a course S.S.E. ¼ E. and subsequently S. S. E. ¾ E., which would take him directly to that entrance. The Admiralty sent Jellicoe the enemy's last course so indicated but said nothing about Horn Reefs.

If the information thus sent had been accepted by Jellicoe as one hundred per cent accurate, the plotted course could have led nowhere except to Horn Reefs. In assuming that it would be so accepted, however, the Admiralty neglected to take into account that it would be weighed by the man on the spot with other evidence at hand. They, themselves, had sent him important information (that the battle fleet had remained in the Jade) which they now knew to be false. They were sending other information which might be wrong. As a matter of fact, their last reported position of the German battle fleet was incorrect and when used as a point of departure for this new course produced a result obviously astray. The Admiralty's own conviction lay in the absolute checking of three items, the call for Horn Reefs, and the two consecutive courses. One of these they omitted and the other two they combined. Thus they robbed the message of all elements of corroboration on which they relied and sent out a naked and unsupported statement. Jellicoe checked it with all the other information at hand, and as it did not seem to check he disregarded it.

In the confused night fighting which followed the German push through Jellicoe's massed torpedo flotillas, we are now concerned with but one circumstance: failure to report battleships identified as such. Cruiser and destroyer engagements advertised themselves, and when reported to the commander in chief produced not the slightest change in his plans. Nor are we concerned with Jellicoe's failure to keep a sufficiently open mind as to his adversaries' intentions—what the experimental scientist would call multiple working hypotheses—and to give due weight to the visible evidence which all pointed to one of the three.

The main charge of failure to report battleships is laid against the *Valiant* and *Malaya*, based on their own reports as submitted after the action.

The *Valiant* reported:

> At 11:35 P.M. observed heavy night action on starboard quarter. From the evidence we surmised that there appeared on this occasion to be two German cruisers with at least two funnels and a crane amidships apparently steaming to the eastward at high speed.[1]

The *Malaya* reported:

> Three points abaft starboard beam observed what appeared to be an attack by our destroyers on the same way as ours. . . . . The leading ship of the enemy which was seen by the flash of their explosion had two masts, two funnels and a conspicuous crane (apparently Westfalen class).[2]

Even here if we are dealing strictly with communications there is a slight distinction. The *Valiant's* error was stupidity in not recognizing a characteristic silhouette. If, even after the battle, she could still class the vessels so described as "cruisers" it did not much matter whether she reported them or not. For the *Malaya* there is no excuse for not reporting, although so far as affecting the result is concerned it is probable that the "steering the same as ours" would have only confirmed Jellicoe in his theory that the enemy was headed south, which soon received fortuitous confirmation from the *Birmingham*.

The night was full of destroyer attacks on German battleships unmistakably identified. As early as 11:40 when the injured *Broke* fouled the *Sparrowhawk*, some were sure that the ships encountered were the *Westfalen* type. Nearly an hour later some leading German battleship rammed and sank the *Turbulent*, last of a strong flotilla which had just crossed the battle line, but though the *Petard* next ahead had to dodge through and through, as the official history puts it, "a blaze of searchlights revealing four battleships in line ahead," nobody turned back or reported. They had been ordered to steer south; theirs not to reason why. Still later the cruiser *Champion*, leading three destroyers, struck and recognized the pre-dreadnoughts, but the cruiser edged away from contact and after the rear destroyer had fired her last torpedo nothing more was said.

Only one officer, Captain Stirling of the *Faulknor*, rose to the occasion. Both before and after the attack that sank the *Pommern*, he signaled his information, but his messages never reached the *Iron Duke*. Admiral Bacon suggests that the wireless was probably jammed by the Germans, but this possibility should have been apparent to the sender at the time, in which case repeated efforts should have been made and acknowledgment requested.

So the night passed and between the human equation and one unexplained failure of material means, the greatest chapter in faulty communication was written.

[1] *Jutland Papers*, 211 par. 133.
[2] *Jutland Papers*, 219. Quoted in Bacon, *The Jutland Scandal*, p. 145.

Lessons

In all this there are lessons aplenty in the art of communication. For those who like to be categorical they may be summarily stated:

1. All orders should have sufficient background of information and plan to make them fit into an intelligible and comprehensive picture.

2. If you change your plans remember that others may have been building their own upon them and take particular care to notify all concerned (French transport plans at outbreak of war).

3. Do not repeat down the line an order addressed to you without careful consideration of the effect it may have in an entirely different set of circumstances (Milne's orders to Troubridge).

4. Never give a "blind order," i.e., one at apparent variance with the situation, without if possible assigning a reason for it (Beatty's eight-point turn at Dogger Bank).

5. If you want information on some particular point vital to your plans do not depend upon its coming in course of routine but ask for it (Jellicoe's failure to locate the German battleships the night after Jutland).

6. In sending information if you have corroborating facts which have helped convince you, send them along that the recipient may likewise be convinced (Admiralty's message to Jellicoe concerning Scheer's course).

7. Scan the wording of every message for possible ambiguity (Beatty's compass signal at Dogger Bank).

8. Use means of signaling adequate to reach all concerned (Beatty in battle-cruiser action at Jutland).

9. In giving orders to the "man on the ground," indicate clearly how far you intend to control his discretion, distinguishing specifically between instructions which may be overridden by changed circumstances or

in view of his closer knowledge and orders intended to bind him in any event (Admiralty to Cradock before Coronel).

10. Keep your subordinates informed at all times of the general and immediate mission, as they may be called upon at any moment to exercise their own initiative (Beatty at Dogger Bank. Jellicoe's night disposition after Jutland).

Of all these, the last deserves some detailed treatment, not only because it is the most important but because it will involve the most radical departure from present practice. The habit of command tends to beget the attitude of the Centurion:

"I say to this man, 'Go!' and he goeth; and I say to another, 'Come!' and he cometh."

For modern instances consider the order given at the Falklands, "Find and destroy the enemy's transport," with the result that the literal-minded captain of the *Macedonean* sank two cargoes of precious Welsh coal. Or the man who marked a parcel for the newly commissioned *Tiger*, "Secret, Not to be opened," with the result that an equally literal-minded captain blundered about for two weeks without any confidential recognition signals. (Filson Young, *With Beatty in the North Sea*, p. 83.)

Those who may consider it beneath the dignity of a high command to accompany orders with explanations and statements of purpose are advised to reread the life of Nelson. That admiral had an incurable habit of keeping his commanders informed of what he was going to do and why he was going to do it. The Battle of the Nile was preceded, not by a course signal, but by, "It is the admiral's intention to attack the van and center."

During the chase of Villeneuve's superior force he explained: "Do not be surprised if I do not fall on them immediately; we won't part without a battle." Later there was the famous "Plan of Attack" written so "the Admirals and Captains of the Fleet . . . . will, knowing my precise object, that of a close and decisive battle, supply any deficiency in my not making signals." Finally there was that equally famous instruction: "In case signals are confused or obscured no captain can go far wrong in laying his ship close aboard an enemy."

There is apparently no mission so apparent that room for misunderstanding may not develop. This is particularly true in the days of submarine or destroyer attacks, or in all situations when simulated retreat may be part of a commander's bag of tricks.

When the chase of Dogger Bank began, Beatty's purpose seemed so obvious that its statement might have seemed puerile, yet results proved otherwise. Under such circumstances the statement of mission may be couched in terms of a fillip to morale. Had Beatty begun with something like, "Nothing less than the whole bag will satisfy England," it is highly improbable that the bewildered Moore would have led his forces from the field to finish a dead duck. If Beatty wished to be less flamboyant and more precise, he could have indicated just how far east the pursuit was to be pushed, that is, the location of the danger line beyond which he had decided not to go.

Still more important are such statements when the situation is involved and complicated. Such was the case when night settled upon Jutland. There was plenty of time for coding and decoding. Let us suppose that after the orders for formation and course, Jellicoe had vouchsafed some such statement of the immediate mission as:

"I propose to keep between the enemy's battleships and their base. The battle cruisers and main force will bar retreat by the Ems and Heligoland. The torpedo flotillas will block the route to Horn Reefs. Report immediately any attempt of battleships to break through. Attacks by light craft may be anticipated and are without significance except as they may indicate presence of battleships."

With this message on the log book every man who saw an enemy battleship would have reported it and would have taken some pains to see that his message got through.

This most important lesson may be simply stated in the form of a question which should be ever present in the mind of every commander in chief:

Is your command so well informed of your immediate mission and general purpose that in the event of the instantaneous destruction of yourself and staff, perhaps in the midst of confusing signals or retrograde maneuvers, that mission will be unhesitatingly and intelligently carried out?

If that question can be answered in the affirmative the dangers inherent in communications have been cut to a minimum.

The Navy *as an* Aid *in* Carrying Out Diplomatic Policies

By Rear Admiral W. L. Rodgers, *U. S. Navy (Retired)*

THE Navy is the arm of the Department of State to enforce the policies of the administration, and has been so employed since the establishment of the government. Nevertheless, the Navy Department has never placed its ships and officers under the direct orders and control of the Department of State, as is done abroad. By the English practice, and I believe elsewhere, the representative of the Foreign Office in each country holds direct authority over the ships of the Royal Navy in the ports of the country to which he is accredited. That is to say, the naval officer takes such military action as the diplomatic officer directs and is without responsibility for consequences. He lands men and occupies the custom house, or captures an insurgent ship, or does whatever else is enjoined by the minister. With us the rule is different. The Navy Regulations prescribe exchange of information, of opinion, and the closest coöperation. But all diplomatic or military action taken by the naval officer is upon his own responsibility to his own naval commander and the Navy Department. A young friend of mine in China is reported to have said recently on giving the order to open fire, acting on his own judgment, "I shall soon have either a letter of commendation or a court-martial." He had the optimism of youth as well as courage. He did well but did not get the letter. For the Department, as for Claudio in the play, "Silence is the perfectest herald of joy." Not very long ago the State Department expressed a wish to the Navy Department for the latter to put all naval ships in foreign waters under the tactical control of the State Department, but the Navy Department refused. There are several reasons for maintaining this separate responsibility for the two departments of government concerned in the same events. One is the difficulty in dissociating administrative from tactical control of the ship's action. The naval force must be fed, fueled, repaired, exercised and drilled during the diplomatic crisis. The positive control of the diplomatic action of the ship would entail a considerable control of the administrative action of the Navy Department in keeping the ship militarily efficient. In the second place, the action of the State Department represents the decision of the President, usually after cabinet discussion. When a naval force is called upon for immediate support of diplomacy, instructions and communications to and from Washington will very often, in fact usually, be sent by naval radio in naval code to the senior naval officer present for transmission to the minister. With the minister and naval officer both in touch with Washington, and only a delay of a few hours at most in communications, any serious divergence of views can easily be referred to higher authority; and on minor matters, discussion before action is desirable. A third reason is that in the past naval independence has frequently saved the United States from being committed to grave indiscretions by the minister. Naval officers begin their study of international law at the Naval Academy and thereafter they live by its rules whenever they are out of the United States. By the time they rise to command rank they have acquired a practical knowledge of the laws of war, of neutrality, of insurrection, and of trade, which is substantial. When ministers were appointed directly from civil life the naval officer was often better prepared for an emergency than the minister. Thus, during the World War alone, I can name more than one instance in which the suggestions and quasi instructions of the ambassador or other representative of the State

Department were disregarded by the naval officer to whom they were addressed, because their acceptance would have seriously compromised the neutrality of this country at a time when its policy was one of neutrality, even in thought. Under the present law providing a permanent foreign service, this condition is of course improving.

The purpose of this paper is to point out by historical examples that when great policies clash, the comity of nations is directed by diplomacy backed by force, and that we must rely more on force to support our diplomacy than on law. Owing to this country's geographical position, which is substantially insular with respect to all countries except Canada and Mexico, our Navy is the first support of diplomacy. For continental Europe, whose countries have land frontiers, the army is the chief reliance. In view of the popular idea shared by many lawyers that diplomacy and force are both somewhat outworn and that it would be well to replace them, to a considerable extent at least, by a more frequent resort to law, I think it not out of place to compare the respective fields of law and of diplomacy backed by force as controlling international relations. Responsible statesmen like to appeal to popularity by expressing a general reliance upon juridical methods for conducting the relations of states, but when specific disputes arise, they are inclined to prefer the diplomatic method. For instance, M. Briand, the French foreign minister, last year initiated the discussions which led to the new bilateral treaty renouncing war as an instrument of national policy. But when M. Briand was in this country eight years ago and prime minister of France, he spoke quite differently. There had been difficulty in settling the boundaries of Silesia under the Treaty of Versailles, and in an eloquent address in Washington he said (November 21, 1921): "Only yesterday in Upper Silesia an incident occurred which suddenly assumed a serious nature. Germany, not believing the French people prepared for direct action, suddenly made known that it was proposed to send the *reichswehr* into the disputed territory. Such are the situations which confront statesmen. I have experienced some, but never any more serious than that one. I firmly made up my mind to say to Germany, 'That is impossible. If any such attempt is made, the most appalling consequences may follow.' If I had spoken without having the strength of the French army behind me, what weight would my words have had? And yet if the proposed action had taken place what would have become of the peace of Europe? What would have become of the young states which have just sprung into being but have not yet attained their equilibrium? That is the problem. *It did not occur because we were able to back our words with force.*" And thus it will always be. Where great interests dominate the international situation, the display of force by the defendant nation will do more to keep the crisis from passing into war than will the appeal to law.

The application of law to international relations is comparatively restricted, because when great international affairs clash, law is not well adapted for directing and controlling peoples as a whole. Law has been developed for ruling individuals. The methods of managing nations, or even temporary groups of men cohering for a common purpose, are diplomatic, negotiatory methods. Nations at variance are ruled by their collective emotions, but law, as the courts like to say, is a rule of reason, and justice fails in an atmosphere of emotion. The law deals individually with persons who defy it and whose strength is negligible against that of the state executing the law. We are misled by a false analogy in thinking that because law overbears individuals when public opinion is decisively behind the law, therefore a system of law duly proclaimed can deal authoritatively with recalcitrant nations. This will be realized when we recall the procedure in the case of strikes or riots. Here a crowd, merely temporary in its nature, without the powerful bonds of race, tradition, and culture possessed by established nations, is brought into unity of conviction and purpose through emotional excitement. It is no longer controlled by law; and in fact, in a riotous strike, neither the government nor the leaders on either side ever think of appealing to the law, although there is plenty of law applicable, and a legal settlement is easily conceivable. To determine the dispute all parties resort to negotiation, to diplomacy, in order to reduce emotion and loosen the crowd cohesion to such an extent that the law becomes able to deal with persons individually. Should

diplomacy fail to dissolve the crowd's cohesion and the crowd remain unresponsive to law, that is, indifferent to the will of the majority verbally expressed, recourse must be made to force; and force applied to a crowd is war, whereas force applied to an individual is a disciplinary penalty. A nation is even less amenable to extraneous law than a crowd; and when its emotions are aroused and it believes itself unjustly treated, it refuses and always will refuse to be guided by a line of conduct which it is told to follow merely because it is alleged to be legal. It will respond to diplomacy and force alone.

Moreover, in international relations, diplomacy is the instrument of progress and law the instrument of conservatism. When vested interests have been created and developed under treaties and international custom and recognized by the comity of nations as law, and afterwards elapsing time and circumstances have rendered the continuance of those vested interests incompatible with new conditions, it is useless to appeal to the so-called law of nations for a remedy; for law recognizes only precedent and the existing rule. In municipal government it is the duty of the legislature to amend obsolete law. In international relations the current rule can be changed only by diplomacy, and the weighty factor in diplomacy, as M. Briand saw, is the national armament. In ordinary business life, as every business man knows, concessions to reach a bargain are made in deference to the strength of the other party's position, and simultaneously the dread of conflict restrains both parties from demanding the utmost. It is so in international relations also. With all its merits, international law is the enemy of change, which appears to law as aggression. A definition of aggression as simple as any offered to the League of Nations would be that "aggression is insistence on change in the international status quo." Change is often undesirable, but when the change embodies necessary progress it is too often condemned as aggression.

Thirty years ago when Spanish misgovernment had raised an insurrection in our neighbor Cuba, the Cubans, struggling to be free from oppression, after years of effort were unable to conquer, and the Spaniards were equally unable to subdue them. The deadlock was the occasion of dreadful inhumanity to the Cubans and American public opinion became seriously affected. It is scarcely too much to say that the national conscience persuaded the people that it should not permit Spain to continue her efforts longer. But no appeal to international law could have aided the unfortunate Cubans. No tribunal could have declared their independence. Neither could any tribunal have cleared the American people of what it felt to be its duty, to remedy the great evil at its very door. The President resorted to diplomacy to help the Cubans and it is now known that he was approaching success when the aroused national conscience drove Congress to declare war somewhat prematurely. But who can doubt that during the diplomatic proceedings a chief card in the President's hand was the knowledge on both sides that the American people were willing to go to war and the realization of the Spanish government that at best war would be a most regrettable measure. In this case, the American Army was small so it was no doubt the American Navy which helped our negotiations to the point of success. But the case of the Spanish War as illustrating the dependence of diplomacy upon force goes farther than the weight of the American Navy as a probable factor in the deliberations of the Spanish government. The intervention of the United States was not acceptable to the German emperor and he attempted to form a European combination to warn the United States not to take action. He had no thought of making war. Had all the great powers said to the United States what France, Russia, and Germany had said to Japan about the occupation of the mainland of China, after the Treaty of Shimonoseki, that her action was not conducive to peace, and was "not recommended," there can be little doubt that this country would have felt obliged to yield to the force behind the courteous recommendation. Austria declared that "only by united and energetic naval demonstration would satisfaction be obtained." But England declined to concur in the joint recommendation, perhaps because Germany had recently annoyed her about South Africa at the time of the Jameson raid, and also because she valued American good will more than that of Spain. With the English Navy absent from the forces available for the suggested

"demonstration," there was lacking the necessary strength to support the proposed recommendation, and nothing was accomplished beyond the dispatch of a mild and polite note as a compromise in which all the powers could join without offense to the United States. A further illustration of the weight of armaments in helping negotiations may be found in the present efforts of the League of Nations to adopt a plan for general reduction of armaments. The Treaty of Versailles provided for Germany's immediate disarmament and also that the Allies should take steps for the early reduction of their own armaments. There can be no doubt that some of the great powers feel little wish to reduce, but Germany has now a seat on the Council of the League, and thence is hinting that if her colleagues on the Council continue to postpone reductions, she will regard herself as at liberty to declare the treaty infringed and so free to rearm and put herself on an equality with the rest of Europe. Thus the threat of German rearmament is perhaps a stronger factor in the attempts of the League to disarm than the desire to observe the terms of the treaty of peace.*

The importance of force as the backer of diplomacy is well illustrated in our relations with the Barbary States. Previous to our Revolution, about 20,000 tons of American ships were employed in the trade with the four Barbary States whose governments practiced piracy. This commerce was protected in some measure by the Navy of England. But when independence was established, the English protection ceased and it became necessary for General Washington to decide whether immunity from piratical depredations by the Barbary navies could best be procured by money or by arms. From the close of the war to 1797 the United States had no navy and in 1792 expressed its willingness to pay $40,000 for a treaty of peace with Algiers, $25,000 as annual tribute, and $40,000 more as ransom for the prisoners of captured ships. A mission was sent out to negotiate a treaty, but the dey of Algiers refused to see the commissioner and captured eleven American ships. This decided Congress that negotiation without force was impotant and in 1794 Congress authorized the building of six frigates. This Act was the foundation of the American Navy and its purpose was to support the diplomacy of the State Department working, as always, for freedom of the seas. But before the ships were ready something had to be done to protect our merchantmen, and late in 1795 a treaty was made providing for the immunity of commerce at an expense of over $600,000 for ransom, money presents, and annual tribute. But as the treaty was not promptly ratified, it was necessary to make the dey an additional present of a frigate named the *Crescent*.

By 1801 the diplomatic situation had changed, for the United States then had a squadron to send to the Mediterranean. The negotiations at first were not firmly conducted by the naval commander in chief, Commodore Morris, and he was dismissed from the Navy by President Jefferson, who was more kindly than George II, who shot Admiral Byng to "encourage the others." In 1804 the American squadron, hearing that Moroccan cruisers were preying on American commerce, visited Tangier, and after the ships had taken position for action, the consul opened preliminary negotiations and found the ruler disposed to make terms, which were accordingly arrived at without either tribute or presents. From 1807 to 1815 we had no men-of-war in the Mediterranean and our merchantmen again suffered at the hands of the Barbary powers. But the peace with Great Britain, early in 1815, permitted a fleet once more to be sent to the Mediterranean under an Act of Congress authorizing the capture of Algerian ships. This Act was a sound basis for resuming negotiations. A satisfactory treaty with Algiers was signed and ratification advised by the Senate, but it was repudiated by the dey and it was necessary for yet another squadron to appear before Algiers and negotiate a second treaty under its guns. This endured, but when it was received by the State Department it was forgotten and did not get to the Senate for six years, when it was then approved and was proclaimed by the President in 1822.

The principal diplomatic service of the

*When the French army under Bazaine invaded Mexico during our Civil War, Mr. Lincoln's diplomatic remonstrances were in vain, for our armaments were fully occupied. But before the middle of 1865, American armies were unoccupied in Virginia and Tennessee and a large force under General Sheridan assembled along the Rio Grande and immediately Napoleon III agreed to the American wishes.

American Navy will always be found in its support of neutrality and the neutral rights of commerce. This support is a fundamental policy which directs the shipbuilding program of the Navy Department. For the Navy must be adequate to guard its commerce when other nations are at war. The growth of the now recognized principles of neutrality has taken place under the demonstration of neutral naval force. It is not yet time to say that they are settled and sufficiently guarded by reference to established practice of nations, which belligerent interest would break. The League of Armed Neutrality established by Russia in 1780 and adhered to by Denmark, Sweden, the Netherlands, Prussia, Austria, Portugal, and the two Sicilies, was not immediately followed by serious practical consequences because the war of France and Spain against England ended soon after (1783), but it was the basis of important provisions of the Treaty of Paris of 1856. How short-sighted it is to limit one's own diplomatic freedom by treaty was shown by Russia in 1793 when she joined with England to starve revolutionary France, contrary to the principles she had avowed in 1780. The second Armed Neutrality of 1800 of the northern powers was formed to insist upon immunity from search of neutral merchantmen under naval escort. This league, like the previous one, was terminated before it had accomplished much, but it led to the compromise of the Maritime Convention between England and Russia providing that neutral vessels may navigate from port to port of belligerents and that blockades must be effective. A word may be said here as to the escort of neutral merchantmen under their own navy. It is still urged that this is proper, but really it can not serve as an acceptable guaranty to the belligerent. It is actually a diplomatic threat to any belligerent ship desiring to search and confronting the escort. The former does not know how far the latter will go in shielding his convoy. The means of communication between governments are now so rapid and certain that there is no longer justification for allowing a diplomatic issue between two governments to be settled by two armed naval subordinates facing each other.

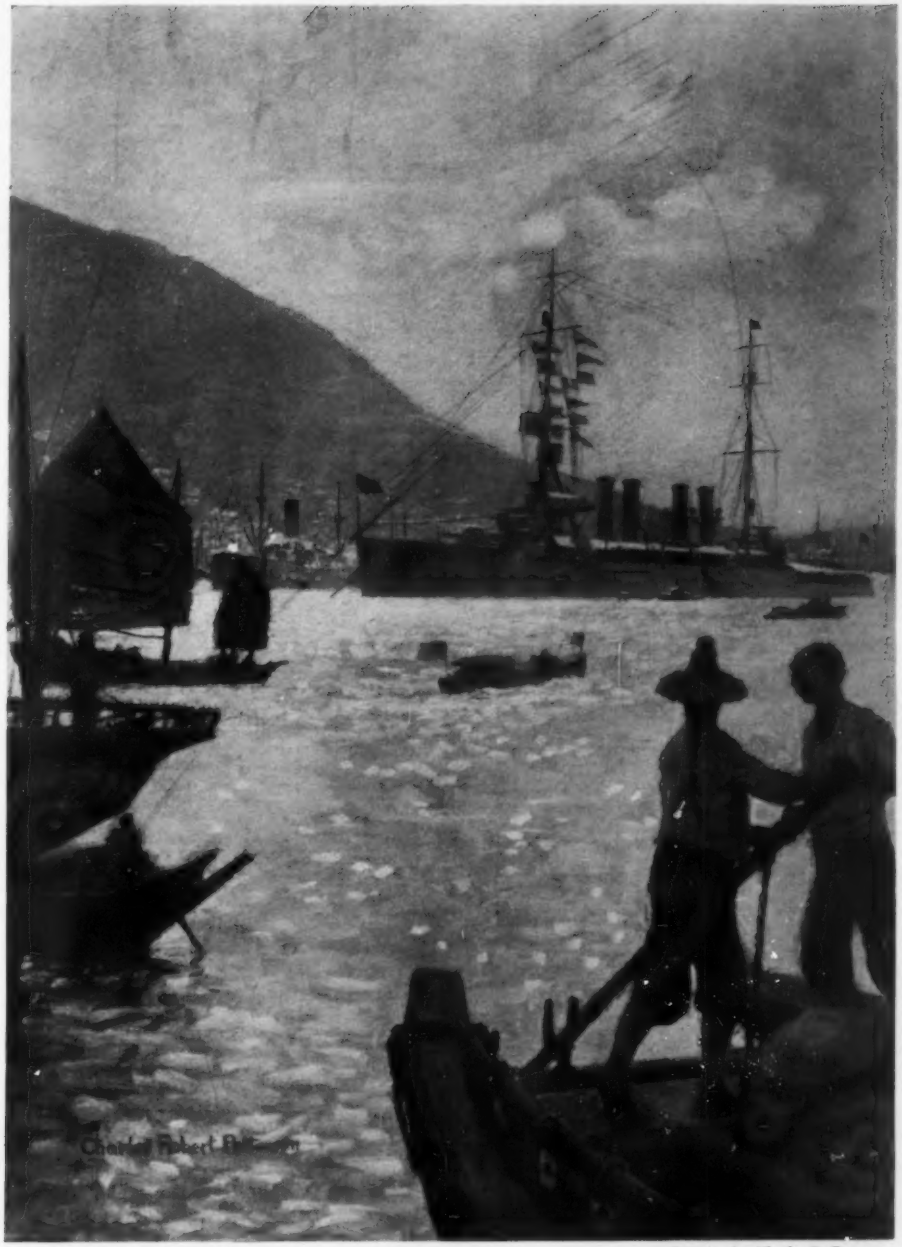
This country's policy has always been for the utmost freedom of neutral trade (except at times when this country herself has been at war). At the Hague Convention of 1907 our delegates took a very decided stand as to this matter but were unable to accomplish anything. However, the Declaration of London was the outcome two years later. This was not approved by the British House of Lords and fortunately was inoperative when the war broke in 1914. The war was won largely by the severest application of rules limiting neutral commerce with belligerent enemies. The observance of the Declaration of London would have been a most severe handicap, if not fatal to the Allies. It is inevitable that such rules will be applied in the future if the belligerent is strong enough to do so. More than ever before, modern means of communication, internal and foreign and maritime, have enabled belligerents to apply effective coercion to their enemy through control of traffic. It is very doubtful whether pre-war agreements limiting belligerent control of neutral commerce with the enemy are desirable for this country.

Without any assumption as to the cause and justice of a particular war and the specific interest of neutrals therein, it is to the interest of all concerned, both belligerent and neutral, that the war shall be fought to a quick termination. When belligerent right to attack the enemy by way of national supplies is limited by pre-war treaties, the war is thereby artificially prolonged for the sake of neutral trade. Thus the neutral profits of the belligerents' misfortune of war is promoted. It seems to me that it is preferable to let the rules of warfare as practiced in 1918 be the accepted ones, subject always, as heretofore, at the outbreak of the next war, to diplomatic pressure supported by the United States fleet. The failure of the tripower conference at Geneva to agree as to the limitation of navies has apparently led Great Britain to consider means of securing her commerce when she is at war, other than by reliance on her own fleet. The proposal of Lord Rothermere in the press, is that the United States and Great Britain should agree to maintain the freedom of neutral trade in war. When analyzed it seems not unlikely to be made to mean that when Great Britain goes to war, the United States might be pledged to guarantee neutral trade with her. It seems much preferable to maintain diplomatic freedom to go as far as American

interests require and no further. This we will be able to do when our diplomacy is supported and our neutrality guarded by an American fleet adequate to the commercial position of the United States and its world markets. The misfortune of lacking force to support diplomacy was exemplified at the outbreak of the World War in 1914. As neutrals we clamored for the freedom of neutral trade, addressing both England and Germany. Sir Edward Grey has told us in his memoirs that his policy in regard to our protests was not to annoy this country enough to alienate the sympathy of our people, but short of that, to do all possible to stop enemy supplies. It was a wise policy, for it was necessary to England to retain cordial relations with us. Otherwise she could not win the war. The German policy was variable according to the estimate of the importance of the United States as an enemy. But at the last the Germans decided that American enmity was not worth dreading and they pressed the submarine activity until we entered the war to their undoing. Had our military strength, available to back our negotiations with Germany, been more imposing, it is not unlikely that Germany would have been more conciliatory in order to keep us off the list of her opponents. In the next war, wherever it may be, with this country neutral, it will be the size of the American Navy which will determine the respect which belligerents will pay to our neutrality and to the security of American commerce. Look what happened to Dutch shipping. It was known that she was determined to avoid war and consequently her shipping was seized by this country without effective protest. We should remember our own behavior, then, when it is suggested that good will and forbearance will protect us from aggression when other nations contend with their destinies at issue.

It is diplomacy backed by force that enables nations to modify existing but objectionable situations which have been recognized by agreement or by acquiescence and so have become a part of the system of international law. Tribunals and arbitration can not go to the root of such difficulties. Diplomacy with the ability to threaten war is the remedial right on which nations and responsible governments put real reliance.

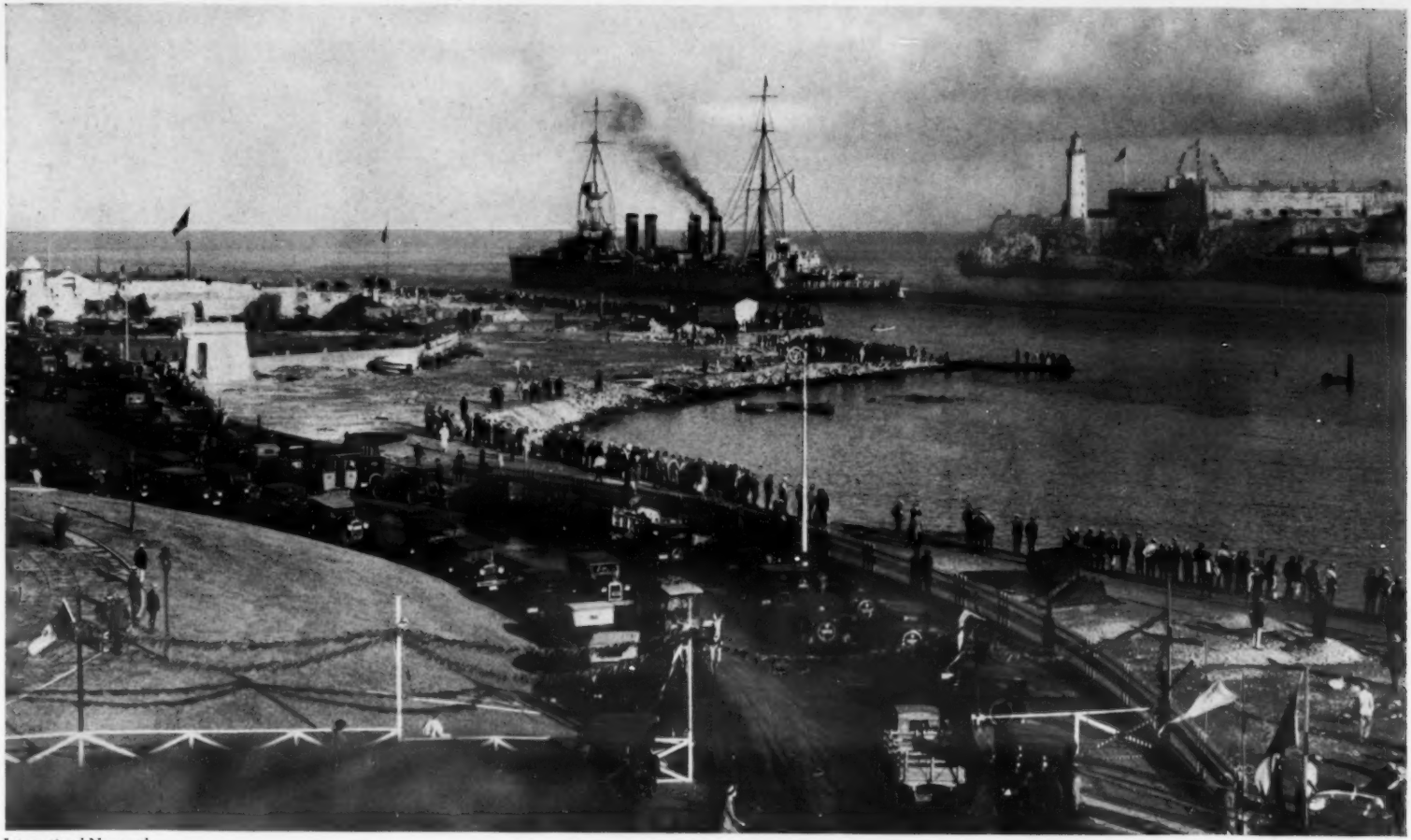
The Bible story of Judith and Holofernes dramatically illustrates the rôle of diplomacy in great crises. When Judith returned in triumph from her encounter with Holofernes, the maidens of Bethulia came forth to welcome her, singing, "Her beauty took his mind prisoner and the falchion passed through his neck." It is the task of diplomacy to take the mind prisoner, but it is the falchion in her hand that crowns diplomacy with success.



Peter A. Juley & Son, New York. Painting by Charles R. Patterson

WHERE EAST MEETS WEST

From the 1927 Christmas card of the Regiment of Midshipmen.

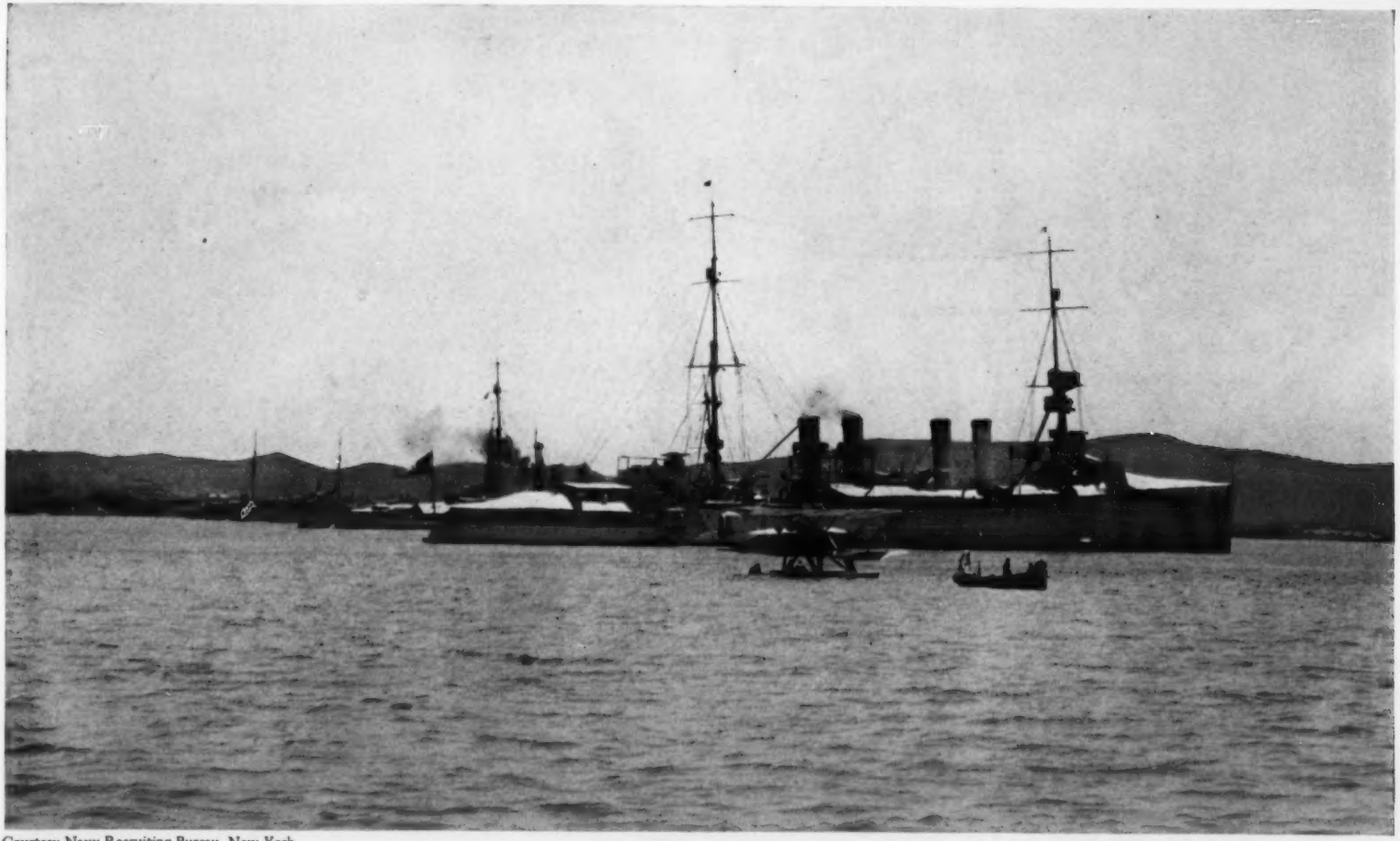


International Newsreel

PRESIDENT COOLIDGE IN CUBA

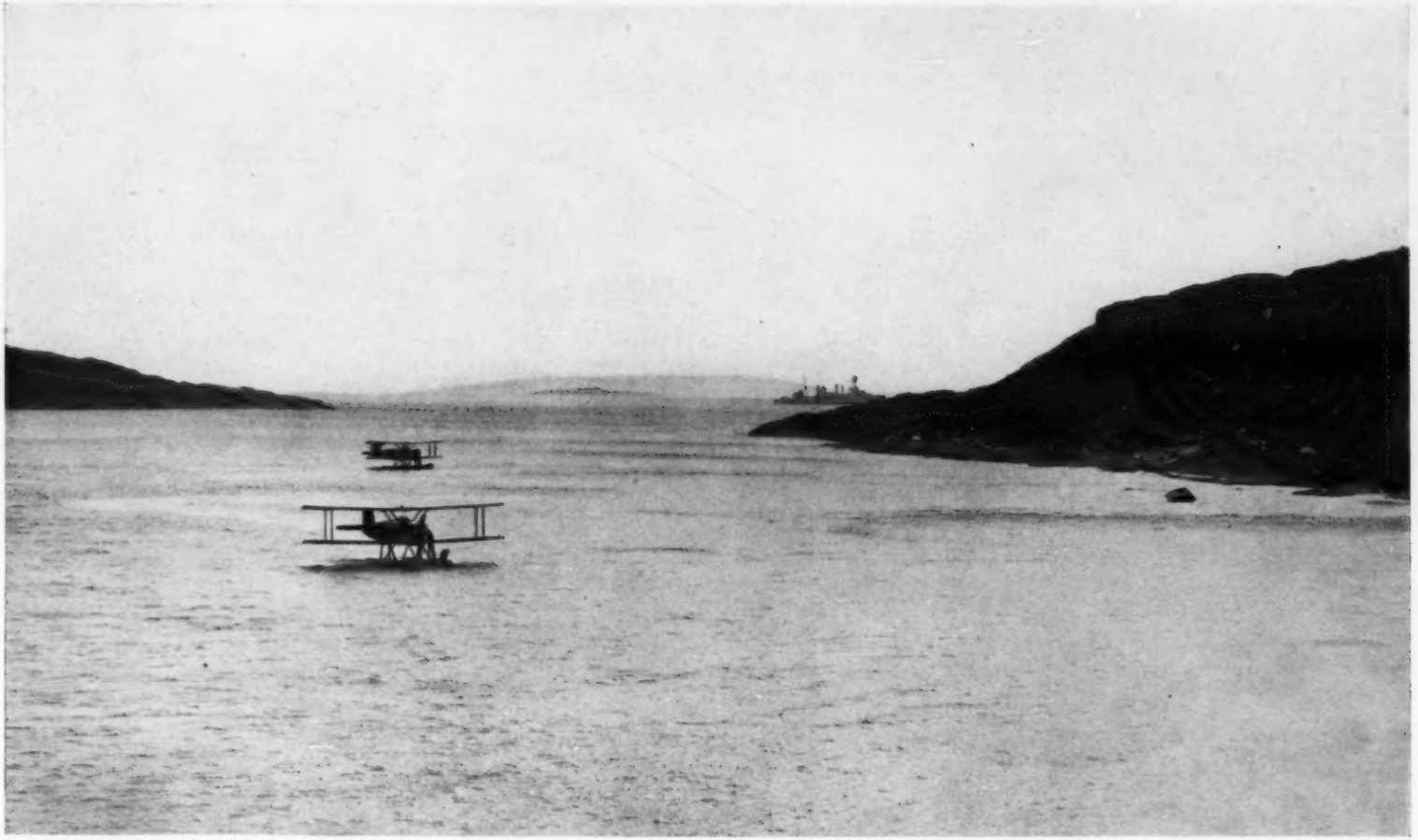
President Coolidge leaves Havana, Cuba, in the cruiser *Memphis*, after delivering the opening address to the Pan-American Congress of 1928.

President Coolidge leaves Havana, Cuba, in the cruiser *Memphis*, after delivering the opening address to the Pan-American Congress of 1928.



Courtesy Navy Recruiting Bureau, New York

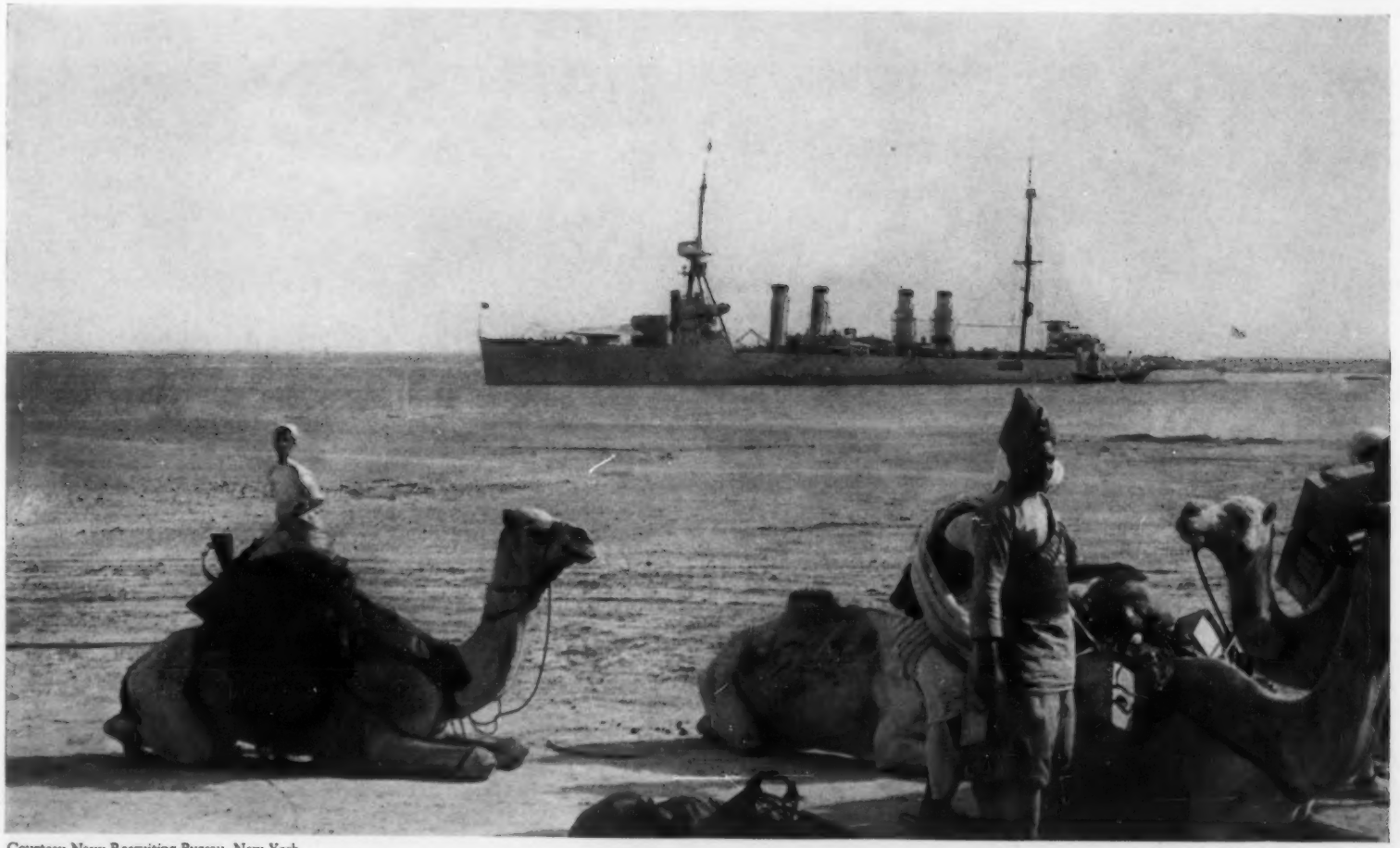
THE U.S.S. *RALEIGH*
At anchor, Guantanamo Bay, Cuba.



Courtesy Navy Recruiting Bureau, New York

THE U.S.S. *RICHMOND* AT ANCHOR, ICE TICKLE, LABRADOR
The U.S. Army around-the-world planes *Chicago* and *New Orleans* in the foreground.

THE U.S.S. *RICHMOND* AT ANCHOR, ICE TICKLE, LABRADOR
The U.S. Army around-the-world planes *Chicago* and *New Orleans* in the foreground.



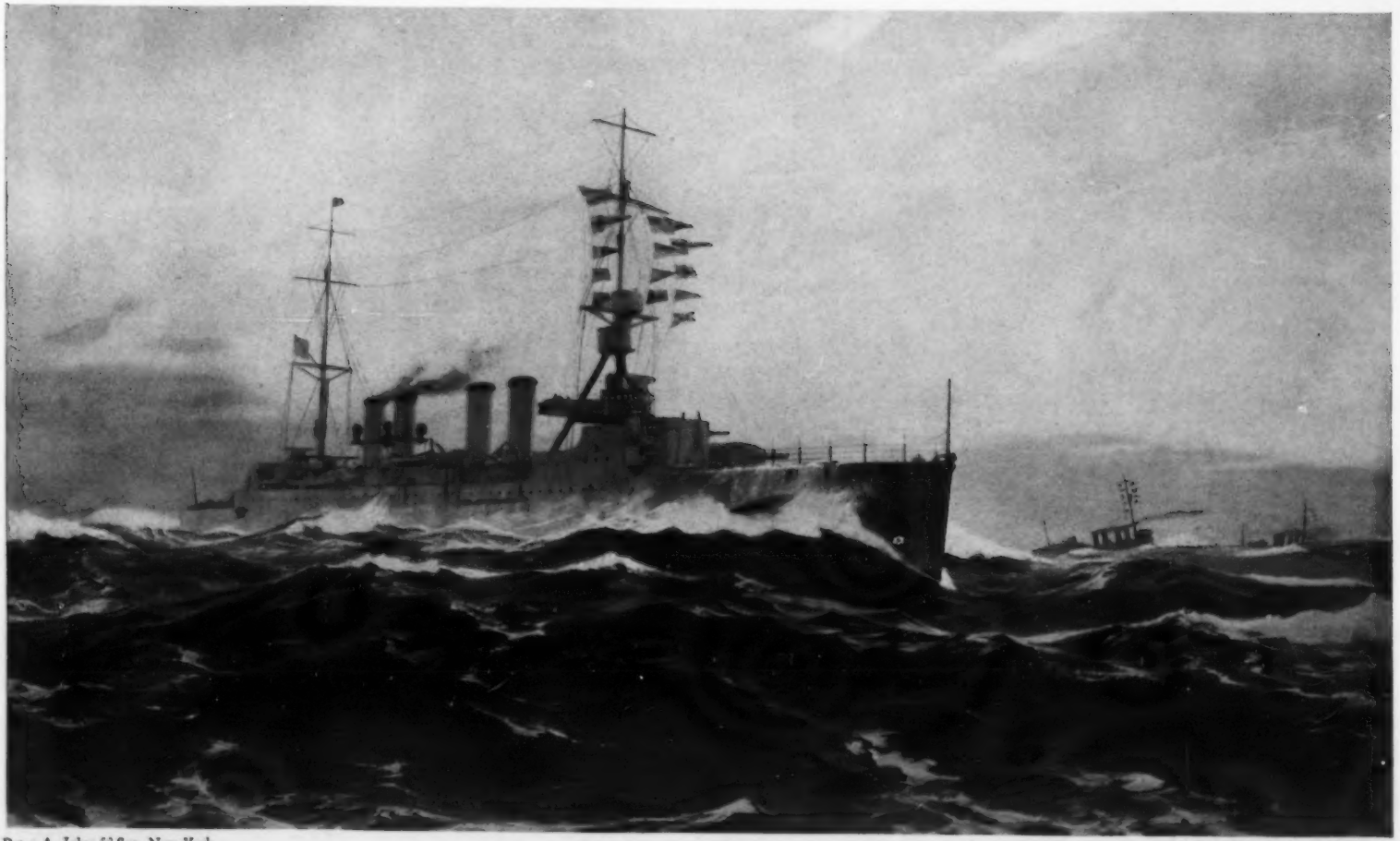
Courtesy Navy Recruiting Bureau, New York

SHIPS OF THE SEA AND SHIPS OF THE DESERT
U.S.S. *Concord* at anchor, Port Sudan.

Courtesy Bureau of Construction and Repair, Navy Department

U.S.S. *OMAHA*
Flagship of the destroyer squadrons, U.S. Battle Fleet.

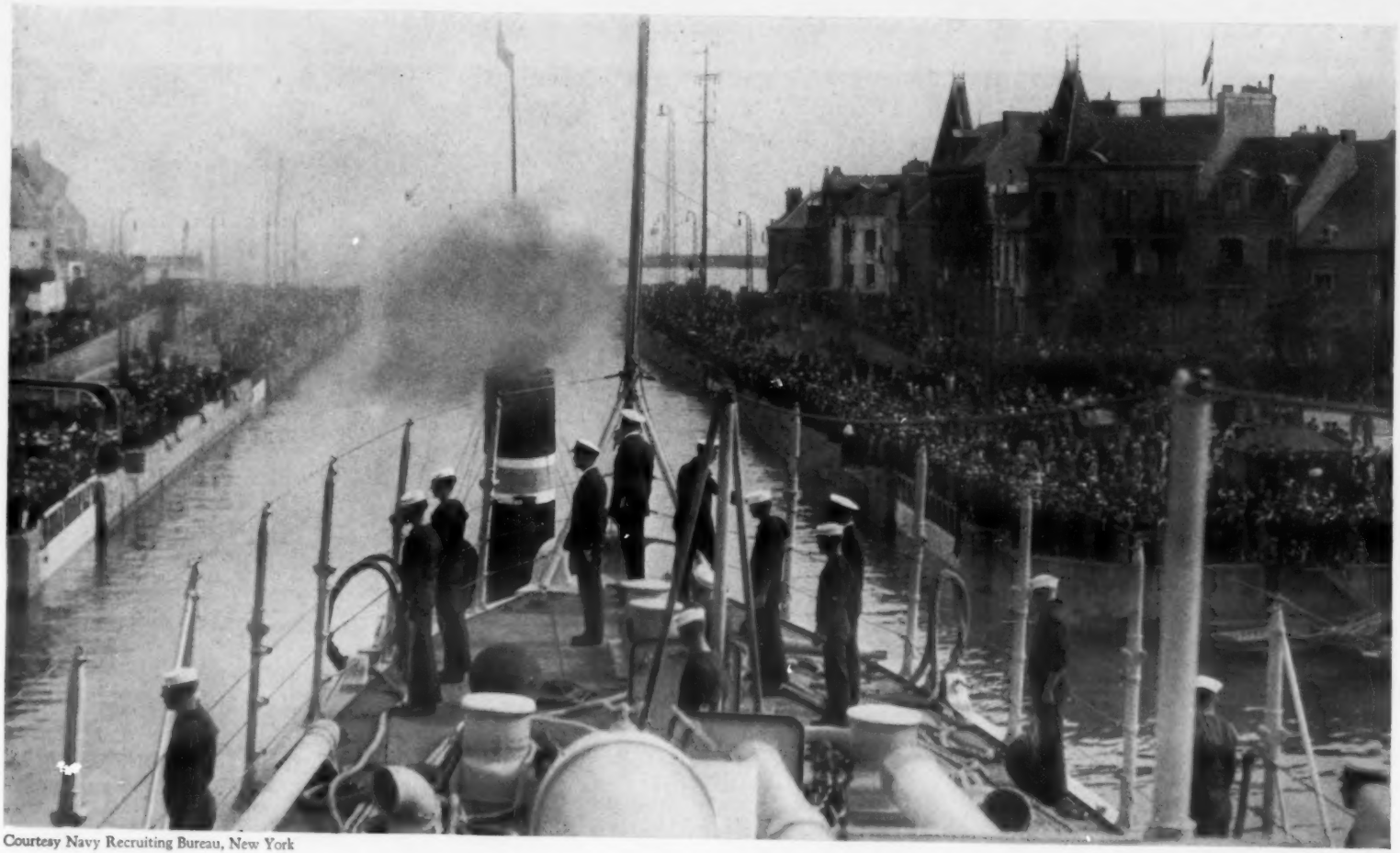
U.S.S. OMAHA
Flagship of the destroyer squadrons, U.S. Battle Fleet.



Peter A. Juley & Son, New York.

U.S.S. *MEMPHIS*

Painting by Charles R. Patterson

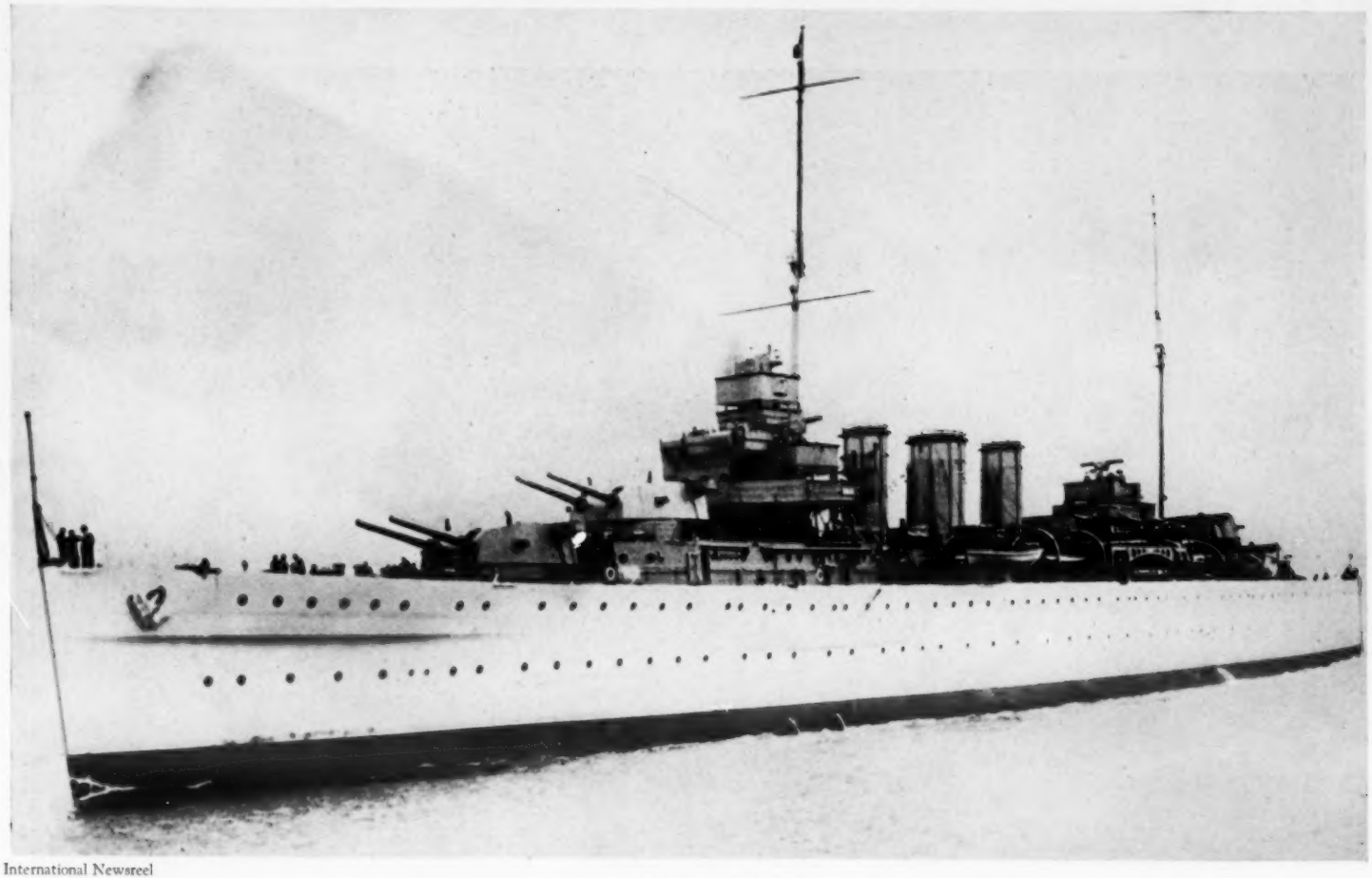


Courtesy Navy Recruiting Bureau, New York

U.S.S. *MEMPHIS* LEAVING ST. NAZAIRE, FRANCE, FOR ANTWERP, BELGIUM

Courtesy Navy Recruiting Bureau, New York

VIEW OVER THE STERN OF THE U.S.S. *MILWAUKEE*, MAKING A SPEED OF THIRTY KNOTS



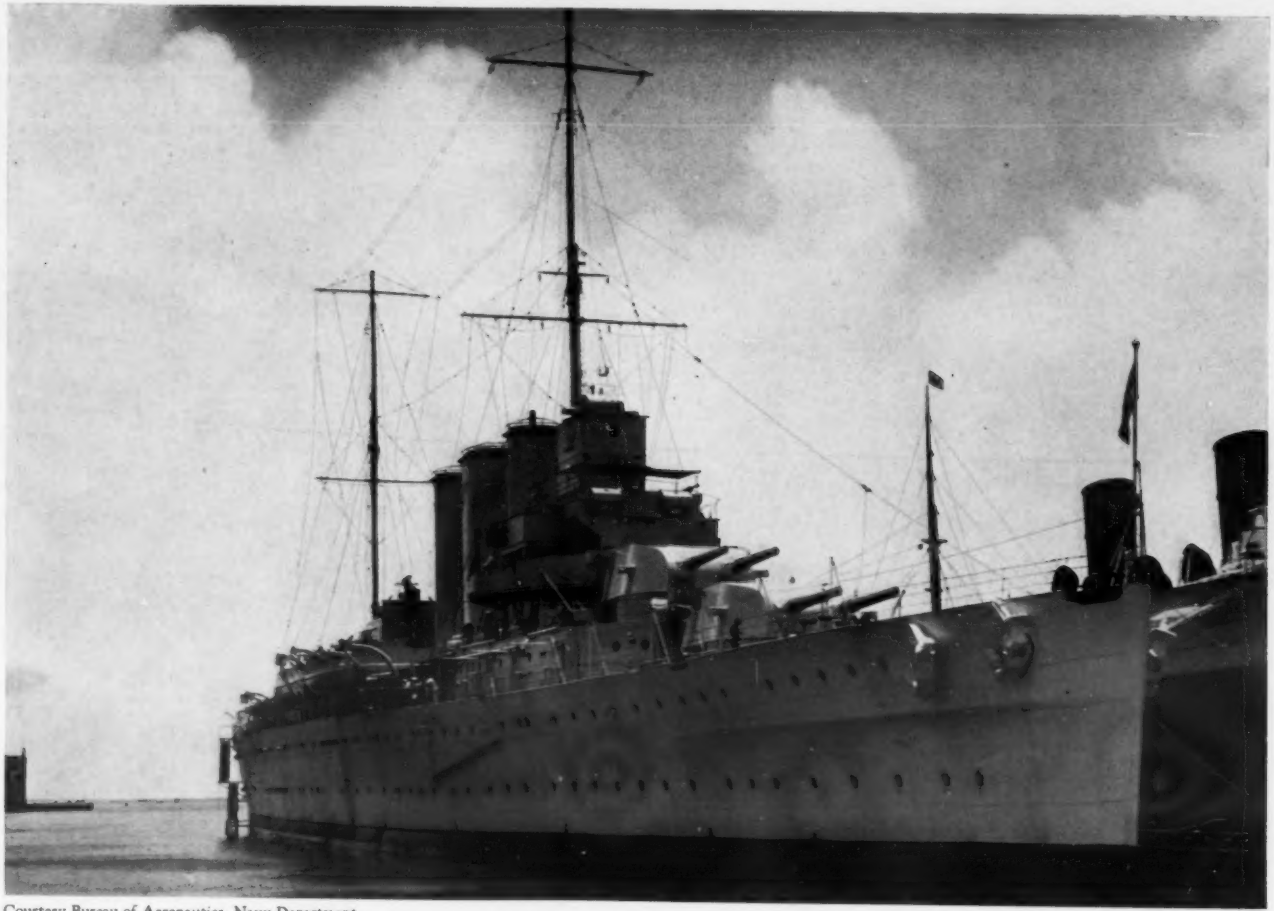
International Newsreel

H.M.S. *CUMBERLAND*
One of Great Britain's new 10,000-ton, 8-inch gun cruisers, with a speed of thirty-one knots.

One of Great Britain's new 10,000-ton, 8-inch gun cruisers, with a speed of thirty-one knots.

Courtesy Navy Recruiting Bureau, New York

LIGHT CRUISER DIVISION AT SEA
Picture taken from U.S.S. *Cincinnati*



Courtesy Bureau of Aeronautics, Navy Department

H.M.S. *CORNWALL* AT HONOLULU

Another of the post Washington Conference cruisers of Great Britain, armed with eight 8-inch guns.

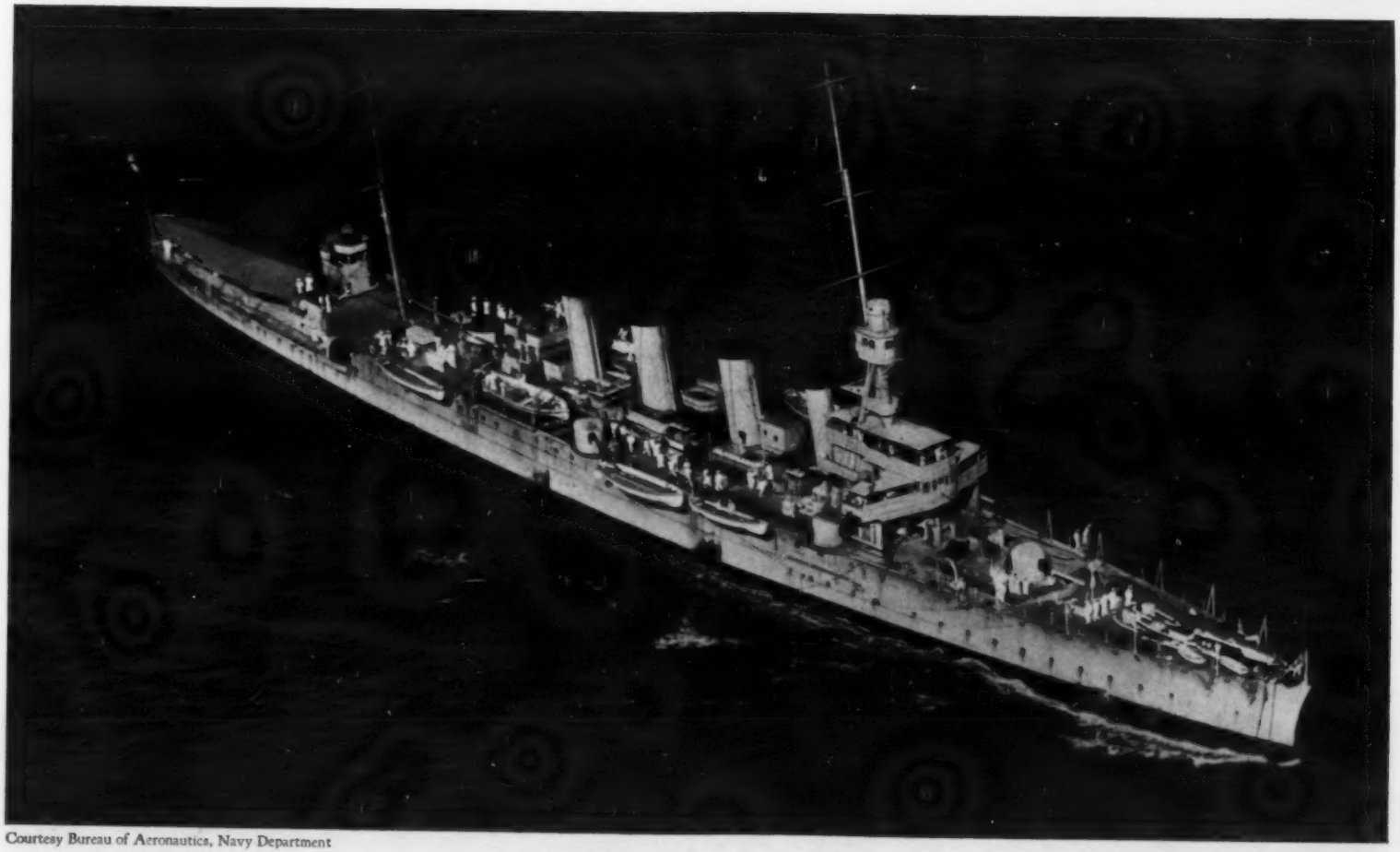
Courtesy Bureau of Aeronautics, Navy Department

CRUISER DIVISION LAYING SMOKE SCREEN

Courtesy Bureau of Aeronautics, Navy Department

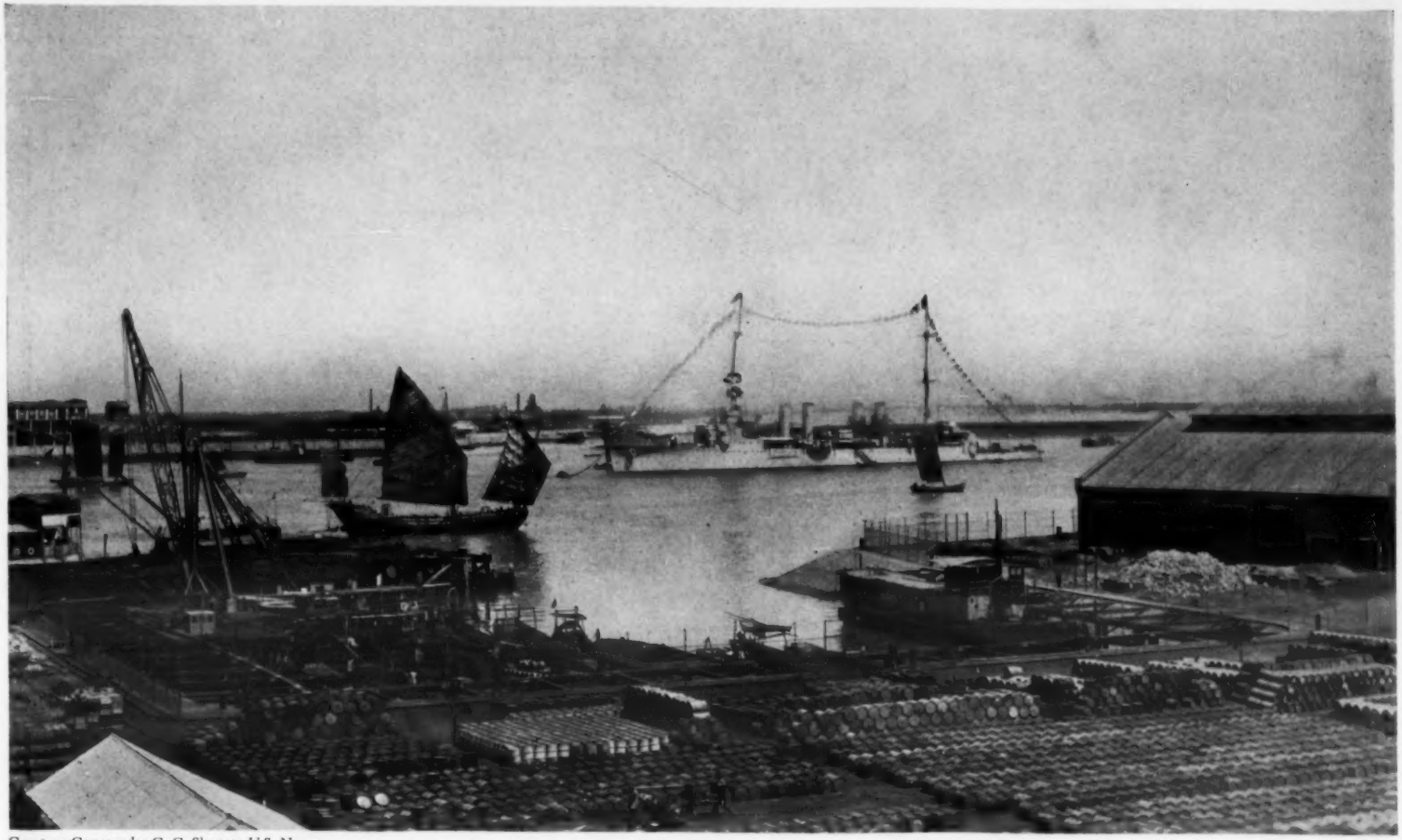
H.M.S. *DUNEDIN*, AT HONOLULU

Three British cruisers attended the Sesquicentennial held at Honolulu last year.



Courtesy Bureau of Aeronautics, Navy Department

H.M.S. *BRISBANE* APPROACHING HONOLULU



Courtesy Commander C. C. Slayton, U.S. Navy

U.S.S. *MARBLEHEAD* IN CHINA

Inspections

By Lieutenant Commander Alfred Tawresey, *U. S. Navy*

CAN we improve admiral's inspections? Can we increase the value of reports of inspections to the High Command? Can we increase their usefulness to all personnel afloat? Can we retain the beneficial features of our present admiral's inspections and at the same time decrease the paper work involved? Can we standardize inspections without stultifying them? Can we reduce the effect of personal idiosyncrasies and deficiencies of inspecting personnel?

It is believed that the answer to all the foregoing questions is in the affirmative. It is believed that the way is clear to accomplish these things. It is believed that careful analysis of the inspection situation will indicate that many changes should be made.

The Precept

Admiral's inspections are provided for in Articles 689, 690 and 765 of the Navy Regulations. Substantial changes in our method of conducting inspections, and in the form of the report can be made without changing these well-established instructions.

The Form of the Report

The form of the report exercises a profound influence on the conduct of an inspection and on the mental attitude towards it. The Navy Regulations do not prescribe the form of the report in detail. Article 690, however, refers to "General Remarks" and prescribes that they shall be followed by a "concise statement of the condition and efficiency of the ship." This might imply that the "General Remarks" is not a concise statement. Judging from the forms now prescribed for the complete report this inference has been taken literally.

It is unfortunate that the context of Article 690 seems to indicate that the principal purpose of the "concise statement" is to establish facts particularly commendatory or particularly condemnatory. If a senior is to ascertain readily from the report the condition and efficiency of a command he needs a concise statement which embodies all essential facts. These include, for example, deficiencies which are not necessarily condemnatory, such as defects in design.

It would appear that if the senior receives a concise statement embodying all essential facts in regard to the condition of the command inspected, he need not receive the "General Remarks" or detailed statements leading to the concise statement. It also appears doubtful if any responsible senior has time to digest the details even if he does get them. The most fruitful field for improvement therefore appears to lie in modification of the "prescribed form" of Article 689.

Inspections as They Are

One familiar with the existing procedure for making, recording and reporting admiral's inspections afloat may well wonder whether or not we, as a naval service, really know how to inspect. The outstanding features of admiral's inspections as we know them are a hectic scramble to cover everything with fresh (and very wet) paint, the laborious answering of a mass of detailed and often obsolete, irrelevant or immaterial questions, the tedious compilation of a lengthy, cumbersome, and wholly impractical report in multiple copy, and finally a pretended detailed consideration of the result by seniors in the face of common knowledge that the senior cannot properly take time to dig into such verbose and rambling reports to discover vital facts.

It is not meant to imply that admiral's inspections as they now exist are wholly bad. It is felt, merely, that they do not accomplish what might be accomplished readily by the expenditure of equal or less effort, if such effort were properly directed by study and planning. There are many good features

about the present inspections which should be preserved. For example, in anticipation of admiral's inspection, our ships are thoroughly cleaned and drilled and their organizations and equipment are put in order. The mere presence of the admiral in the ship being inspected is beneficial. The officers who assist the admiral are taken into sister ships under conditions ideal for making observations to lift them out of the rut into which they may have sunk in their own ship.

PRINCIPLES OF EFFECTIVE INSPECTIONS

Before proceeding to a discussion of what are considered to be the defects in the present inspections and suggesting alternatives to overcome them, it may be well to set forth the conception of the principles upon which it is deemed inspections should be based.

The principles underlying inspections are the same, whether inspections are formal or informal, and whether or not a written record is made. In order to secure an effective inspection a logical and methodical sequence should be followed. The oft-expressed truth that any system is better than none should not deceive us into accepting standards obviously below those readily attainable. There can be but one best way to accomplish anything. While we may not discover immediately the best way to conduct and record inspections, we have been making them long enough to be well on the road toward finding that best way.

The mission of inspections should have three important aspects: (1) to ascertain the condition of the command inspected; (2) to instruct the personnel inspected; (3) to instruct the personnel inspecting.

The things inspected in any command should be grouped for clarity of conception and for convenience under three well known principal headings: (1) operation; (2) personnel; (3) material.

In any inspection, one or more of these headings may be paramount. Nevertheless, in any effective inspection it is essential to give some consideration to each of these three headings. Failure to visualize this fundamental conception may upset the orderly thought process necessary to the conduct of an effective inspection.

In addition to orderly thought process, the conduct of an effective inspection requires a degree of standardization of procedure and method. Standardization is necessary in order to: (a) save time and labor; (b) overcome deficiencies of personnel inspecting; (c) secure uniformity, assuring universal understanding; (d) eliminate individual idiosyncrasies; (e) secure a just basis for comparison; (f) afford common justice to commands inspected; (g) secure a sound basis for measuring progress.

PRESENT DEFECTS

Our present admiral's inspections are believed to be susceptible of improvement in the following respects: (a) they are not sufficiently thorough; (b) they do not utilize to the maximum the opportunity for instruction of inspecting personnel; (c) they do not utilize to the maximum the opportunity for instruction of personnel inspected. (d) they do not clearly differentiate between matters that are operation, personnel, or material; (e) they are not sufficiently systematic to insure securing the maximum result from the expenditure of time and effort; (f) they do not sufficiently overcome the deficiencies and idiosyncrasies of inspecting personnel; (g) they are not sufficiently uniform to insure universal comprehension of their significance; (h) they do not afford a just basis for comparison even of like commands; (i) they do not accurately measure progress and they do not clearly indicate retrogression; (j) they lack the complete disinterestedness and frankness necessary to efficiency; (k) the reports are too long to be considered properly and are wasteful of time and effort because of the number of copies which must be made; (l) the reports are in large part a duplication of other reports which they do not replace, and they are not used for much beyond occasional praise or disciplinary action.

A few words on each of these points should serve to convey the reasons why they are considered to be deficiencies and to establish their present existence.

INSTRUCTION OF PERSONNEL

Items (a), (b) and (c) of the preceding tabulation are all closely related. A brief examination of the "prescribed form" for the present inspections of battleships, light cruisers, destroyers, and other types will demonstrate the fact that the detailed lists of questions to be answered are widely di-

vergent. This is true, not only where made necessary by divergence in type and installation, but also in many cases where identical installations are to be inspected. In some forms the detailed questions for a piece of apparatus or for a given exercise are reasonably complete while identical subjects are dismissed with a word or two in the forms for other types of ship. If all the questions were taken from all the forms and combined into one large form there would remain many subjects inadequately covered or not covered at all.

A thorough examination of the prescribed forms for inspection shows that they bear but casual relation to the publications of the War College, the division of fleet training of the Office of Naval Operations, the questions asked of officers on examination for promotion, and various other official publications setting forth what should be done and how it should be done. Either the official publications or the inspection forms are deficient. In view of the effort which has been expended since the War in bringing the official publications up to date and in promulgating standard instructions, there can be little doubt as to which is wrong.

It is realized that if the questions for inpection were made complete enough to satisfy the conception of a thorough inspection herein presented, it would be entirely impracticable to embody all of them and their answers in the final report of the inspection. Therefore, the present form of report would have to be abandoned. For this reason, and for other potent reasons hereinafter discussed, it is proposed to abandon the present form of report, and, in fact, to include in the final report none of the detailed questions.

Operation—Personnel—Material

Referring to subhead *(d)* of the foregoing tabulation of defects, the present forms are, almost without exception, thoroughly confused as to any clear cut distinction among matters that pertain to operation, personnel, or material. This is believed to be a defect in that not only does it tend to prevent clear thinking with regard to the inspection but it also hampers proper evaluation of the notes taken during inspection, and of the report itself. These three headings, or the ideas conveyed by them, are distinct entities in the conduct of naval affairs. The words themselves are used in the Navy Regulations and generally throughout standard instructions in the naval service to cover groups of subjects considered as collective and related. Division of subjects into groups which fall properly under these headings is a stimulation to correct thinking, proper weighing of relative values, and to sound administration.

Balance

Growing partly out of the failure to distinguish among the three fundamental divisions just dealt with, and partly out of other causes, is the defect dealt with under subhead (*e*). Examination of the inspection forms will show that because of the miscellaneous arrangement of questions it is extremely difficult to divide the labor of detailed inspection logically among several officers. It is true that the forms have the questions grouped under headings which are more or less significant. For example, nearly all the questions which appear under the caption "Engineering" have something to do with the engineer department. Within this crude grouping, however, there is a hopeless jumble of questions pertaining to operation, personnel and material.

No one can rightly regard an inspection form as balanced if it dismisses the health, comfort and general welfare of the crew in half a dozen questions and then asks twice or three times that number of questions about the condition of the signal bridge or the method of handling correspondence.

Individual Idiosyncrasies

Referring to subhead (*f*), the present form leaves a great deal to the imagination, and permits almost unlimited space for the zealot in the form of extended remarks or general comment. While it is undesirable to suppress too strongly enthusiasm and zeal, nevertheless, if the standard inspection form were adequate, there would seldom be need for appending any remarks in amplification. The enthusiasm and zeal might well be diverted into preparing an adequate inspection form.

With the present forms, a competent officer who is assigned to make a part of an inspection, realizes at once that the form is not thorough enough with regard to the subject he is inspecting. If he is an expert and

is energetic, he is very apt to ask and to answer additional questions of his own, and to submit them in the form of additional remarks, or at least to submit the conclusions he draws from them. This is believed to be very undesirable. It immediately distorts the picture presented by the report. If what he has to say is commendatory, it immediately focuses attention on that part of the report, seeming to imply that what he inspected was so much better than what everyone else looked at that it had to be given special treatment. This is often not the case, and items less prominently treated may be superior to the one which received the apparently preferential treatment. On the other hand, if the zealous expert submits extended remarks which are unfavorable, an unfair and probably an incorrect picture is presented by the report.

UNIFORMITY

With reference to subhead (*g*), while the inspection of different types of things, and inspection for different purposes must necessarily differ in detail, it is believed that the report should be uniform. The object of the report is to set forth the condition or state of what was inspected. No good reason is seen why there should not be a standard Navy form to summarize this information. Such standard form should be one known throughout the service, containing the essential information in an established order, in an established place on the form. This would greatly facilitate obtaining information from the report, measuring progress or retrogression, and the comparison of commands.

In the case of an official investigation or other legal proceeding there are certain well established forms in use, although such legal proceedings may deal with a variety of subjects. We use the same kind of a discharge certificate for a 100-pound blond that we use for a 200-pound brunette. There appears to be no good reason why we cannot use the same form to show the condition of an 800-ton submarine, a 30,000-ton aircraft carrier, and the Vickers' installation of a destroyer.

Subheads (*h*) and (*i*) are more or less connected with the discussion under (*g*). The present forms of report differ for the different types of ships and they depend for their complexion so much on the personality of the inspecting party, and they are compiled under such vague standard instructions that they have little real value for comparison between commands or for measuring progress.

RESPONSIBILITY

Subhead (*j*) deals with a feature which is perhaps not quite so obvious as some of the others, and which is somewhat delicate to discuss without being misunderstood. As has long been the custom, most of our admirals' inspections are conducted by the immediate superior in command. Of course the immediate superior in command is directly responsible to his next senior for the condition of the command inspected. It is not natural to expect that the officer responsible for the condition of the command will inspect with as critical an eye or that he will be as brutally frank in reporting conditions found as would be an entirely disinterested officer. No dishonesty or neglect of duty is implied. Cognizance is taken merely of human limitations. While it is unquestionably desirable for subordinate commanders to inspect the units of their command for their own information, and while the commander in chief is unquestionably entitled to the opinions they form thereby, it is submitted that at least an occasional inspection by an officer wholly disinterested might divulge desirable information.

In this connection, the Board of Inspection and Survey, Navy Department, which may make military inspections under the provisions of Articles 406 (1) and 420 (4) (b), Navy Regulations, appears to be the only regular, experienced inspecting agency which can be regarded as wholly disinterested so far as personal connection with the command inspected is concerned.

PAPER WORK

Referring to subhead (*k*), anyone who has superintended the making, in multiple copy, of one of the present reports of admiral's inspection can testify to the fact that they are burdensome. A great mass of detail included in the final report is of no earthly use to anyone save the personnel of the command inspected. The present forms contain detailed questions and answers which should aid the inspecting party in arriving at a conclusion as to what the condi-

tion of the command inspected is. As pointed out before, however, it is hardly detailed enough or properly balanced enough to enable the formation of a sound conclusion and it is too detailed to enable the reviewing senior to establish his own conclusion.

Happily enough for the inspecting party, the report form leaves them a wide latitude as to how to state the condition of the command inspected. They can be quite general, and they usually are. The result does not mean much to the reviewing senior. He has two alternatives, one, to "rubber stamp" the report, and the other, to delve into the detailed questions and answers and try to conclude for himself what the answer should be. Any unit commander who is devoting the proper attention to his many other duties has not time to consider the heterogeneous mass of details in the inspection report. Therefore "rubber stamping" is common, and we trust to luck to get the real answer as to the condition of the command.

It is believed that the questions and answers should be in such detail that nothing is left to the imagination, and that they clearly support the conclusion as to the condition of the command. The report of the inspection should consist solely of the conclusions and certain other major items of information, and should be of such length that it can be considered personally by reviewing seniors.

Utility

Referring to subhead (*l*) of the list of defects, as pointed out earlier, the present reports serve largely as a basis for disciplinary action or for commendation. In making the present inspections, however, a great deal of ground is covered which must be covered all over again in order to secure action. It is probably necessary under present conditions that separate action should ensue. With a thorough inspection, however, there appears to be no good reason why several existing reports, returns and correspondence might not be eliminated. A large part, if not all, of the report of material readiness should be covered on admiral's inspection. There appears to be no reason why work requests should not grow directly out of admiral's inspection. Similarly many other reports such as those dealing with adequacy or inadequacy of complement, efficiency of apparatus, etc., might reasonably come directly as a result of, if not as a part of, admiral's inspection.

The Remedy

Having discussed what are believed to be the defects of the present system, a remedy will be suggested. The remedy can be applied without change in the present regulations, and with but slight change in present practice. It is believed that the remedy herein suggested involves solely the application of increased method, mixed with common sense. It is believed, further, that the suggested remedy can be applied to the present system without causing any upheaval therein, and that it will accomplish some good, without being capable of causing any harm.

Briefly, the suggestion is that the inspection be conducted by means of a detailed questionnaire or check-off list, similar to the present questions and answers, but much more complete, derived in different manner, and to be disposed of in a different manner. The questionnaire is not to form a part of the report of inspection. The report is to consist of a brief summary containing an essential statement of the condition of the command, compiled by the inspecting party after study of the notes made in answer to the questionnaire. This summary is to be forwarded in multiple copy as is the present report. However, it possesses the advantages that it is short and easy to copy, is short enough to be considered by reviewing seniors, is readily filed and easily referred to, and is sufficiently standard to form a sound basis of comparison among commands of all types.

The Summary

The summary, which is really the report of inspection, is conceived to consist of one or two sheets, showing in a standard arrangement, the name of the unit inspected, the date and specific purpose of the inspection, the name of the senior inspector, the name of the officer responsible for or in command of the unit inspected. It tabulates, with suitable subheadings under the three main headings—operation, personnel and material—the opinion of the inspecting party as to the state of the command inspected, formed after careful study of the answers in the detailed questionnaire. It shows,

abreast of each opinion for the current inspection, the corresponding opinion at the last previous inspection. Then follows a list of deficiencies found on inspection and those found on the last previous inspection.

In other words, this conception of a report of inspection is deemed to be analogous to the "facts" and the "opinion" established by a board of investigation. The detailed evidence on which the facts and opinion are based is contained in the detailed questionnaire, described later, which is not to be forwarded with the report. It is believed that such a summary report would serve all the purposes for which reports of inspection can be used ordinarily and that it would present a much better "bird's-eye view" of the command than does the present report.

Once the form and arrangement of such a summary is established it would be more or less permanent, regardless of what changes progress might cause in the questionnaire. Such standardization should be helpful to the High Command not only because of the simplification and the uniformity of the reports but also because of the indoctrination and the standardization of thought and method which would necessarily be behind it.

The Questionnaire

The detailed questionnaire is conceived as a complete, detailed list of questions, so designed as to elicit the information necessary to form the opinion called for in the summary. Such list would necessarily be longer than the present list in the inspection forms. It would also be more complete, better balanced, more pertinent, more progressive and generally more thorough. This list would be compiled under direction of senior officers, from all sources available, including all that the records of the Department could supply and all that the experts could furnish. It would be revised from time to time. It would be as nearly standard for a given type of inspection as possible. It would, however, be issued as a guide to inspecting parties with the intention that it was not mandatory, but that it represented the best current list available and was to be used in the absence of something better. The senior officer convening the inspection would be the judge of whether some other list actually used was better or not, and the burden of proof would be on the inspecting party.

The detailed questionnaire would be arranged under the same main headings and subheadings as used in the summary. It would be split up among the members of the inspecting party, as is the present list, with the difference that the division would be logical and easy. Each vessel or unit to be inspected would be furnished with a copy of the latest questionnaire for their own use. This would not only afford them a chance to prepare properly for the inspection, but would also afford them valuable educational material as to standard methods.

The questionnaire would be filled out at the inspection in rough form, and in single copy. It would be used by the inspecting party to compile the summary, much in the same manner as the rough observations taken at target practice are used to compile the finished report. After the report had been compiled, the questionnaire, with a copy of the summary report, would be returned to the command inspected. Here it would serve to show the causes underlying the opinions expressed in the report, would serve to educate the personnel as to the things needing their attention, and would be filed for reference when desired by competent authority.

A Beginning

Progress in a small way toward the type of inspection herein outlined has been made in the forces afloat. The form adopted for the inspection of destroyers in the Battle Fleet some four years ago was a step in this direction. An attempt was made to fit the inspection to the things required to make a destroyer efficient. A check-off list, not forwarded with the report, was introduced. In general, however, only a start was made. The final report was still replete with unnecessary detail, and the check-off lists covered only certain phases of the inspection, and covered those phases incompletely. The fundamental concept in operation, personnel, material, was not specifically recognized, and the report form unbalanced as to proper division of effort to these three essentials.

Results on Shore

The suggested form of inspection and report was adopted outright about three years

ago for the routine inspection of shore radio stations. A standard questionnaire was furnished each commandant by the Chief of Naval Operations. Commandants were not required to follow the standard questionnaire *verbatim*, but care was taken to make it sufficiently excellent that in most cases they followed it voluntarily. The report was restricted to a summary of the type herein proposed.

This trial has been producing constantly improving results. Inspections have become more thorough, more uniform, easier to make, and the reports are now concise and clear. The office of the Chief of Naval Operations has, with this system, for the first time, a convenient picture of conditions at the several shore radio stations, all to the same scale. The reports are now actually used by the office receiving them, and it is easy to determine whether or not a station is living up to the prescribed standard. Comparison of stations is rendered possible and profitable.

The standard inspections and the contributions to the standard questionnaire have brought to light several improved methods of operation, formerly in use at one or a few stations, but now standard for all. Furthermore, the questionnaire being a liberal course in what to look for in an inspection of a shore radio station, satisfactory inspections of shore radio stations have been made by officers who were not qualified radio experts.

Trial Afloat

One of the destroyer tenders recently adopted this type of inspection and report for all detailed inspections required to be made by her technical personnel. The form of inspection is adaptable to any activity, and is used by the tender cited for such divergent inspections as electrical equipment, radio, fire control, boilers, gyro compasses, main engines, and auxiliaries. The form of the summary report in each case is identical, although of course the subheadings under the three main headings—operation, personnel and material—are suited to the needs in each case. The detailed questionnaire is of course different for each inspection.

A sample of the summary used is as follows, and it is this form of report which is suggested for all naval inspections:

INSPECTION OF THE

U.S.S. .....

.....U.S.N.
(Name) (Rank or rate)

In charge of.....
(Activity inspected)

By

.....

.....

.....

On:.....
(date)

Copies to:

Original to Commanding Officer, U.S.S.....
(ship inspected)

File to Commanding Officer, U.S.S.....
(Tender)

The second page of the report appears as follows.

Page 1.

Summary of Inspection

1. State briefly nature and specific object of this inspection.
2. When and by whom was last inspection made?
3. Proficiency of (.....), i.e., inspector's opinion of proficiency of station for performance of duty for which designed and operated, in terms of "Excellent," "Very Good," "Good," "Fair," "Indifferent," "Poor," and "Bad."
   (activity inspected)

Item	Present time	Last Inspec.
1. *Operation*		
(a) General	.....	.....
(b) Efficiency in handling ( ) problems as indicated by daily work		
(c) Efficiency in handling ( ) problems in emergencies	.....	.....
(d) Compliance with authoritative instructions		
2. *Personnel*		
(e) General	.....	.....
(f) Discipline	.....	.....
(g) Instruction and training	.....	.....
(h) Permanency of personnel	.....	.....
3. *Material*		
(i) General	.....	.....
(j) Is installation capable of performance for which designed.....	.....	.....
(k) Housing and messing.		
(l) Recreation	.....	.....

The third and last page of this summary appears as follows:

Page 2.

4. *Deficiencies*
(Deficiencies noted on last inspection and not corrected are indicated by an "X"; those which can be corrected by ship or station force are indicated by a "Y"; those beyond the capacity of the ship or station force are indicated by a "Z.")

ITEM

1. *Operation.* (a), (b), (c), etc.
2. *Personnel.* (e), (f), etc.
3. *Material.* (g), (h), (i), (j), (k), etc.

In this particular case the inspection forms contain the following instructions, on the back of the cover sheet:

Page 3.

1. The ..... on each destroyer will be in-
(activity)
spected at frequent intervals by the tender, in order that the vessel concerned may be assisted in determining the proficiency and state of readiness, both of the equipment and the personnel involved; and that the tender may be enabled to foresee and plan for probable work requirements beyond the capacity of the ship's force.

2. These inspections may be made at any time, when most convenient. They will be made whenever any major work request is submitted, or any casualty is reported.

3. After the summary of inspection has been drawn up the original of the memorandum guide (check-off list) and the original of the summary will be forwarded to the commanding officer of the vessel concerned for his information and guidance. The file copy of the summary will be retained by the commanding officer of the tender for his information.

4. An entry "not inspected" will be entered in the blank spaces of the summary and memorandum guide for any part of the activity not inspected."

The memorandum guide referred to is the same thing as the questionnaire or check-off list referred to throughout this discussion. In the case, for example, of the inspection of the fire control installation of a destroyer, it consists of eighty-three detailed questions, listed under the same headings as appear in the summary.

The form of inspection herein suggested is not original with the author, nor is it entirely the work of any individual. It is believed, however, that it tends along sound lines, and that adoption of the principles involved will go a long way toward improving our inspections, as well as lessening that ever present bugbear—paper work.

On Military Education

By CAPTAIN WILLIAM P. CRONAN, *U. S. Navy (Retired)*

For war, least of all things, conforms to prescribed rules; it strikes out a path for itself when the moment comes.

—Thucydides, Speech of the Corinthians, 432 B.C.

While the fundamental principles of war are neither very numerous nor complex, their application may be difficult and must not be limited by set rules. Departure from prescribed methods is at times necessary.

—U. S. Army Field Regulations

It is now generally believed by all who have made a careful study of the military art, that, to secure unity of action, and, at the same time, to take advantage of favorable opportunities before it is too late, subordinates must act on their own initiative without orders from their superior in accordance with a general doctrine with which all are familiar.

—Frost, "Night Torpedo Operations," NAVAL INSTITUTE PROCEEDINGS, August, 1917

THIS is written for young officers—old ones may read it if they will; most, if not all, I am confident, will agree with me. But it is to the younger generation of naval officers that I address myself, knowing that the future of the Navy lies in their hands. Sir John Jervis, Nelson's friend, truly said that the efficiency of a Navy depends upon its lieutenants.

On the side lines, condemned and surveyed by hard-hearted doctors, I have still such great love for the Navy as to attempt to pass on some of the experience I gained in active service, hopeful that it may be of value as a guide to you who will be the Navy's leaders in future.

I can now see the Navy from a detached viewpoint, which shows perhaps a different picture from the view obtained at closer range.

I will begin at the beginning of my own career, at the Naval Academy, which was in my time a much smaller school than the wonderful establishment now at Annapolis. It was a good school, however drastic in its academic requirements; my class, '98, began with eighty-four plebes and graduated less than half that number. The officers who were our instructors were earnest men who did their best by us, but they gave us no instruction in a military sense, as pertaining to command, save that imparted at infantry and artillery drills. The duties of an officer were learned in some fashion by those who were cadet officers but there was no school, however elementary, to teach us our duties as leaders in war. I can recall only one officer, the late Rear Admiral, then Lieutenant, H. S. Knapp, U. S. Navy, who ever attempted to impart such information. This he did very earnestly, sincerely and well, to his ordnance section, of which I had the good fortune to be a member, prior to our graduation just before the war with Spain. It was not, however, part of the course, nor did it pertain to ordnance. I still remember one vivid phrase of his instruction, "Young gentlemen, you must lead your men by precept and example—they will follow you through the Gates of Hell; but you must go first!" At no other time did we receive any instruction in matters pertaining to war.

We had lots of seamanship—stick and string. I loved it even if it never did me much good; I often wished, later, that I had been required to learn as much about the fundamentals of engineering, particularly electricity, as I learned about tacks and sheets, clew garnets and buntlines, never to use them in service. In the year 1897, one lieutenant gravely told us that the finest naval officer was one who knew just when to spill the wind out of the lee clew of the mainsail in order to keep station in a fleet under sail. That was doubtless true of sailing masters in Nelson's day, but the naval actions of our Civil War, over thirty years

before our time, were fought with armored vessels, propelled by steam; our Navy, in 1865, was the finest Navy afloat in material and experience, even though many of the ships were of special types evolved to meet the conditions of the war.

The early eighties found the Navy in the doldrums, with but few ships. Except for a few monitors, relics of the Civil War, the ships were wooden sailing vessels, with auxiliary steam, almost useless for war purposes. The spirit of the Navy had been maintained by the glamour of spars and sails; its military spirit was dormant excepting in so far as Admiral Luce had maintained it by his earnest pleas for the establishment of the War College. Successful at last, he had the foresight to secure the assistance of Captain Mahan in historical research.

These pioneers laid the foundation for the renaissance of the military spirit of the Navy. Like all prophets, they were not appreciated at home and the War College struggled in adversity for many years. How true are the words of Montesquieu, "Prosperity is our stepmother—adversity is our mother." Had it not been for the support of Rear Admiral H. C. Taylor while chief of the Bureau of Navigation, the War College might not have survived the opposition.

To lay the foundation, as the lawyers say, for what follows, let us consider the teachings of psychology respecting habit, with resulting character. We are told that the personal habits of individuals are fairly well fixed at the age of twenty, as to the use of clothes brush, tooth brush, soap and water; the social habits tend to be fixed at twenty-three—at this age a man is known by the company he keeps; at twenty-eight, professional habits tend to crystallize into character—the young lawyer or doctor has acquired the manner of his calling; at forty, the curtain is down, the man is made, as to habits.

Crystallized habits constitute character; it is very difficult for an old dog to learn new tricks. Of course intelligent men can acquire new information at any age but to assimilate that information and to use it becomes increasingly difficult with advancing years; therefore it is important that professional education should be acquired early in life, in accordance with sound principles. Yet it should be borne in mind that the old adage, "Young men for action, old men for counsel," is in accordance with human nature. An old officer, who knows his business, is better equipped for leadership than any young officer, for no matter how much the youngster may know, he cannot possibly have the mature judgment and knowledge, acquired by experience, possessed by his elder. The leaders of the German Army during the World War were all well advanced in years, but they had been trained from youth for war and knew their business better than any of their juniors.

In the transition period of our Navy, during the later eighties, and the nineties, it was only natural that the technical features of officer education should be emphasized, as it was a tremendous revolution to evolve a new Navy of such radically different physical character. Hence the education of officers in my time was material, rather than spiritual; there was so much to be learned that was new, that no time was given for the study of the old, unchanging principles of warfare, which, because simple in essence, were taken for granted, as something that anyone could apply when necessity arose. Those were regarded as the best officers who were the best technicians; to become a bureau chief was the highest ambition of these able men.

During the Spanish War we had as leaders, however, many officers who had served in the Civil War; they were of the military type, far superior in military qualities to many who followed; this, however, through no fault of the latter type, but rather because of the defects of the system of education.

I attended a summer course at the Naval War College in 1909. A lieutenant, thirty years of age, all of my service had been as a junior officer; it was by accident rather than design that I went to the War College; certainly it was not because there was any professional incentive to go there.

I found the course delightful and far from irksome, as it was not necessary to work hard. Occasionally we listened to interesting lectures, which were to me like all lectures in that they left no lasting impression. We were divided into committees, given subjects to study, submitted our reports and debated them in open forum. There was some game-board work but not much.

I remember one outstanding incident. Admiral Luce, then long retired for age, one day gave us an impassioned address on the need for utilizing the training ship *Cumberland,* then new, stationed at the Training Station, but never used under sail. With earnest zeal, the lovable old admiral, the fire of youth renewed in his eyes, besought us to use her for the training of seamen for the fleet, as some seamen would still be needed even in battleships, as good boatmen. So favorably was I impressed with the admiral's powerful plea, that shortly thereafter, in the library, on meeting Admiral Sperry, I spoke to him about the matter, saying that I thought we ought to carry out Admiral Luce's idea. I have never forgotten Admiral Sperry's caustic rejoinder: "Cronan, there is nobody quite so conservative as an old buck lieutenant."

From that moment, I began to realize how much I had to learn and alas, to unlearn; the remainder of my short stay at the War College was spent in an earnest effort to acquire knowledge; I had come to scoff and remained to pray. Even though we had yet to learn of system in military education, and had not yet heard of a mission, an estimate of the situation, or an order form, or all-pervading soul-like doctrine, at least we were groping toward the light. Well do I remember the repeated insistence of Lieutenant McCarty Little, of the staff, that "A principle is a principle when it does apply —it isn't a principle when it doesn't apply." He was one of the pioneers.

We left at the end of the all-too-brief summer, realizing that in the War College the Navy had its most broad-minded institution.

It was not until 1911 that the fruit of the tree of knowledge began to ripen. This was the year of the Navy's renaissance. In that year, Captain William L. Rodgers became president of the Naval War College; with Captain William McC. Little, U. S. Navy (Retired), he had endeavored in prior years to secure adoption of a system of Higher Command, as taught at the Army War College, which he had attended.

It had become clearly apparent to Captain Rodgers, as the result of earnest study, that the system of Higher Command evolved by von Moltke and used with success by the German Army during the Franco-Prussian War, as taught at our Army War College, was similarly applicable to the Navy. As president of the Naval War College, Captain Rodgers inaugurated the system at the college, as the basis of instruction for officers in attendance.

This was a tremendous step in advance; if you will read the history of the Austrian Campaign of 1866, where von Moltke's system was first employed, leading to its subsequent perfection and use during the Franco-Prussian War, you will realize what a revolutionary step von Moltke took, when for the first time it was recognized that the day had gone when a commander in the field could personally command, in accordance with the Napoleonic tradition. Owing to the increased area of the theater of war, it had become necessary to delegate authority in accordance with a system of command based on sound psychological principles.

The results were first apparent afloat in 1913, when the new method was installed in the torpedo flotilla of the Atlantic Fleet, under command of Captain W. S. Sims, who had on his staff Commander W. V. Pratt and Lieutenant Commander D. W. Knox. These officers had been on the War College staff and were thoroughly schooled in the new system, which they proceeded to drive into us, under the leadership of our able flotilla commander.

New ideas are generally painful to acquire; to me, who had the good fortune to command a destroyer, and later a division in that flotilla, they sounded at first like Choctaw or any other unfamiliar language. The errors we made reveling in our new freedom were grotesque. We had yet to learn that initiative, spurred by zeal, wears the curb of responsibility. Eventually, as is generally the case, the converts became the most zealous disciples. We went forth to spread the doctrine, which was not always well received.

I had the exceeding good fortune to go from the flotilla to Operations in the Navy Department as one of the assistants of Admiral Fiske, and to take a minor part in the struggle of that gallant officer for recognition of the same principles with which I had become acquainted in some slight degree in the destroyer flotilla, through the earnest efforts of Sims, Pratt, and Knox. Admiral Fiske, a strategist of ability, was hindered in his efforts to organize the Navy for war, as much by fail-

ure on the part of some brother officers to understand his language, as from political opposition. On the eve of war was indeed late in the day for the new thought to pervade the entire naval structure.

If it was difficult for most officers of the line to know what it was all about, how much more difficult it was for technicians among line and staff officers to understand the new idea. But at last, despite opposition from both within and without the Navy, Admiral Fiske succeeded in having the office of Chief of Naval Operations established by Congress. This is the nucleus of a general staff for the Navy (perhaps better called an admiral staff), in accordance with the teachings of the War College, as the fundamental requirement in organization for efficiency in war—the purpose for which the Navy is intended. Admiral Fiske had been an earnest student at the War College, knew his business thoroughly, and succeeded because he was able to convince Congress that he knew what he was talking about.

This was the second great step in the military education of the Navy and likewise myself, for I was humbled again to realize how little I, at the very center of the Navy's organization, really knew about strategy and war organization and Higher Command. But there was some consolation in realizing that I was far from alone in that respect, as the Navy at large had yet to be educated for war.

Soon after, command of the *Supply*, at the island of Guam, gave me leisure to study. "Sweet are the uses of adversity." I found in that ship a most complete military library, accumulated by her former commander, Lieutenant Commander (now Rear Admiral) F. H. Schofield.

For the next two years I proceeded to read everything I could lay my hands on pertaining to naval warfare, and war in general.

After chasing submarines and carrying troops, and commanding a destroyer squadron, at last came the much-desired opportunity, in 1920, of attending the Naval War College, where I put in some of the hardest work of my naval career, trying to catch up to the standard I should have attained long before, with far less effort, had there been opportunity.

This time we had to work, according to the plan used at Dotheboys Hall. "We go upon the practical mode of teaching, Nickleby; the regular education system. C-l-e-a-n, clean, verb active, to make bright, to scour. W-i-n, win, d-e-r, der, winder, a casement. When the boy knows this out of book, he goes and does it." Thus spoke Mr. Squeers. You, too, will wash the windows of your mind, at the War College.

I left the War College as a captain at the age of 42; it should have been as a lieutenant commander at the age of 32, as the instruction I had received was, for the most part, elementary, though excellent.

We were almost unanimous in recommending that there should be a junior course at the War College, where the fundamentals may be learned at an age when they are still so readily assimilable as to form character. Happily for you who follow after, there will, in the future, be even more elementary schools of application in the fleet, so that every officer will have a fair start, while yet young enough, in acquiring military character.

I would urge all young officers to read continuously the great war classics, so that later on, when you are actually at school, you will have opportunity to give undivided attention to the course.

In other words, you should be familiar with the principles of warfare before being called upon to apply them. Read history, for the greater part a record of wars, their causes, and effects ("History is the guide," says Foch); read all of Mahan, especially his *Naval Strategy*, including the inspiring introduction by Admiral Luce; Henderson's *Stonewall Jackson;* and Foch, *Principles of War*.

The Army works diligently to gain military education; it has an elaborate system of elementary schools leading up to the War College and service on the General Staff; that those profit greatly who avail themselves thereof I will illustrate by the following anecdote.

After the Armistice, while commanding a transport, I had occasion to leave Brest by train for Paris. In the same compartment was an officer of our Army, a dashing, handsome major of horse, not a young man by any means. I call him a major of horse because there was no doubt of his calling; he looked it and talked it, when not cursing the unkind fate that had com-

pelled him to serve without advancement during the war, while brigadier generals ——, and ——, far junior to him, "a pack of those d——d Leavenworth whippersnappers," were chiefs of staff of army corps. Remembering that my major had been prominent in horse shows as a judge, and was a noted polo player, I came to the conclusion that had he studied his profession in its higher form he too might have had higher rank.

Another cavalryman once told me that horsemanship is often overrated in the Army, for at best the horse is a means of locomotion for the transportation of force; the soldier who is merely a horseman is apt to be a sorry soldier.

The ship is your horse. While not desiring in the slightest degree to minimize the importance of your fundamental duties with the ship, as every naval officer, in addition to being a gentleman and scholar and competent seaman, should excel in at least one technical branch of his profession, I do wish to emphasize the fact that the day will come when, as commanding officer of a ship, you should be able to indulge yourself in the the occasional luxury of regarding the ship as a unit, understanding its relation to other units, for the greater glory of the fleet in which you have the honor to serve. Later on, commanding type groups of ships, or task groups, you will be forced to look upon your ships as units and unless you learn so to think early enough, you will never be able to see the woods for the trees.

It is at the War College that you will learn how to apply the principles of warfare, for it is the major mission of the War College to afford officers an opportunity to acquaint themselves with the principles of naval warfare and *to train them in the application of those principles.*

Of course, service in an active fleet is the best school of tactics; but the fleet cannot get underway every day in the year, while the game board is always ready for use, with the possibility of infinite variety as to types and maneuvers; its use bears the same relation to fleet tactics that subcalibre practice bears to target practice. The interchange of views around a game board is not the least of its values—constant direct association with brother officers engaged in the same task is a source of inspiration that cannot be gained anywhere else.

You may be told that the War College course is not practical; if so, ask your hard-boiled sailor friend if he can organize a task group to accomplish a war mission, provide for its logistics and write its orders. He may ask you: "What are logistics?" It certainly is a practical matter to get out an order to move a fleet, or part of it, from port to port in peace time; even if only to get out an order that can be understood.

You are now engaged in the arduous task of renewing the military efficiency of a fleet which was broken up, through necessity, during the World War, largely to serve the Army in its service of supply; elsewhere to act on the defensive.

You now serve in the finest fleet we have ever had; your leaders are men trained for war, selected for their high rank by the most drastic method used in any Navy. To prepare yourselves for the responsibilities and honors that await you, I would show you the necessity for earnest study of the art of war, in accordance with prescribed methods, so that a thorough knowledge of principles will warrant you even in departing from those methods if necessary, as there are no set rules in war.

Some Hows *and* Whys *in* Electric Meter Calibration

By LIEUTENANT EMIL B. PERRY, *U. S. Navy*

IN THE good old days, in the British merchantman service, it was customary to sign on crews under two separate sets of articles; one set at a certain rate of pay with the privilege of "growling," and the other set with an extra pound a month but "no growls."

You need not ask a sailorman which set of articles was the more popular. The right to kick goes with the freedom of the seas. The American merchant service, always notoriously hard, didn't even offer the "no-growl" articles!

Sometimes growling is permissible, and one of these times is when you feel that your voltmeters and ammeters are not telling you the truth.

In the submarine service, voltmeters and ammeters play an all-important part. They measure the power required to drive the vessel through the water at given speeds, thus telling you the horse-power which the oil engines must develop for equal speeds; they measure the power input to the storage battery and the power taken out, thus giving an indication of the state of charge of the battery and its watt-hour efficiency; they tell you what power your various motors are taking; what current you are putting into your battery and what you get out, thus giving the ampere-hour efficiency; they point out the sick cells; they dictate at what rate you may charge and when you may discharge no more; speed is regulated by the ampere load; and, by a simple calculation, they tell you the mean effective pressure developed in each cylinder.

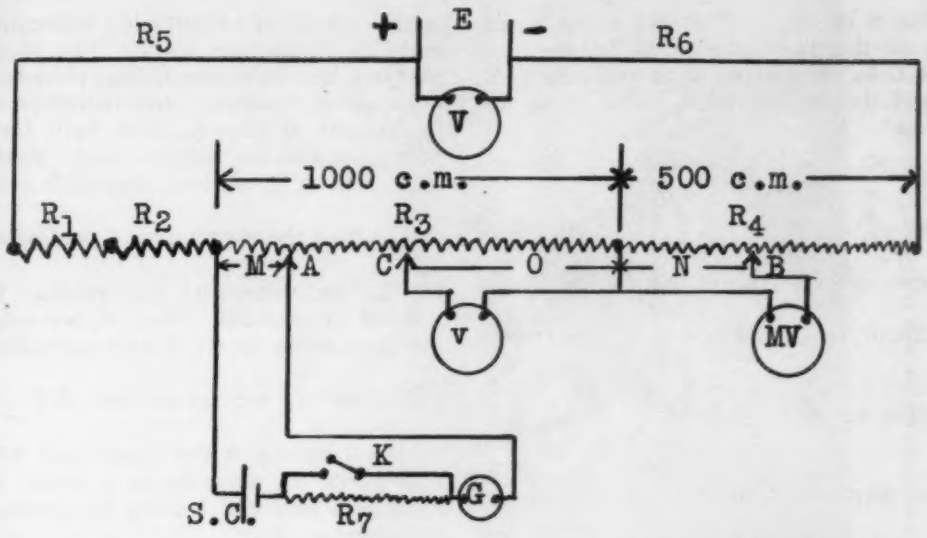
Were we to set up a list of all of the virtues of accurate voltmeters and ammeters the average citizen would soon forget all of the other things that he has heard about submarines in the immediate past and readily believe that all that the submarines need for excellent operation is good, reliable, accurately calibrated meters. Of course the Navy knows different. We need the twenty-five per cent! However, Mr. Average Citizen would not be so far wrong. Without dependable and accurate meters, correct today, tomorrow, and every day, proper operation is not possible. Unfortunately, absolutely accurate meters, like the dodo bird, are scarce.

Instruments for use on submarines are of the electromagnetic type, the voltmeter being hooked directly across the line while the ammeter consists of a shunt and milivoltmeter with the necessary leads, the shunt being in series with the line while the milivoltmeter is calibrated to read in amperes the current passing through the shunt by the "drop" across the shunt. In other words, the milivoltmeter is actuated by the very small E across the shunt, this E being equal to the IR drop of the shunt.

The easiest and most logical way to check up these meters is by comparison with a standard. There comes the rub. What is standard? Surely a portable meter which has been used for general testing could not be called standard. Even if a meter were carefully calibrated in a laboratory and then carried on board ship and kept for some time in the custody of various people, it could not be called truly standard.

It is obvious that there must be some means of keeping a continuous check on the accuracy of these so-called standards—a means that is within the capacity of the average tender and its personnel. It must be simple, cheap, and positive.

The writer was confronted with just this problem, which was solved by building the test set as shown in the figure.



In this figure, R_1 and R_2 are two spool resistances of about 100 ohms each; R_3 is a slide-wire of Nichrome resistance wire of about 10 ohms per thousand centimeters; R_4 is a slide-wire of bare copper wire of about .15 ohms per 500 centimeters; R_5 and R_6 are the leads from the source E to the ends of the potentiometer; while R_7 is a high resistance of about 11,000 ohms in series with a standard cell, *S.C.*, and a galvanometer G. Resistance R_7 is capable of being shorted out by means of the key K.

V is a high-potential voltmeter to be calibrated; v is a low-potential voltmeter to be checked, and MV is a milivoltmeter to be tested. They should be checked one at a time but, since the wiring diagram is the same, they are all included in the one figure.

The method of using this potentiometer for calibrating a voltmeter is as follows:

Hook up the ends of the leads to a variable source of electric current, E. With K open, move slider A on R_3 until the galvanometer indicates no current flowing through the standard cell. Close switch K, get final balance and record the distance M. Read and record V_1 as indicated by the voltmeter V. Change the potential E and repeat as above for as many points as desired on the scale, the more the better.

We can now make a form which will look like this:

M	V	*True voltage*	*Instrument error*
M_1	V_1		
M_2	V_2		
M_3	V_3		

Now let us see what we have found. We know that:

Resistance of R_3 per centimeter $= \dfrac{R_3}{1{,}000}$

Voltage of *S.C.* $= H$ (given with the cell).

Resistance of length of slide-wire $M = \dfrac{MR_3}{1{,}000}$

Therefore I, current of circuit $= \dfrac{H}{\dfrac{MR_3}{1{,}000}}$

$$= \frac{1{,}000H}{MR_3}$$

Also we know the resistance of the complete main circuit, $R_t = R_1 + R_2 + R_3 + R_4 + R_5 + R_6$.

Therefore, $E = IR = R_t \times \dfrac{1{,}000H}{MR_3}$ and since R_t, H, and R_3 are known, the formula simplifies to $E = \dfrac{k}{M}$

E will be the true voltage and when that is inserted in our form above we are ready to get the instrument error, either positive or negative.

Similarly, for the calibration of a low-voltage voltmeter, we hook up as shown,

putting v in place. Now we obtain a balance of the galvanometer as before, then move C to successive points and record M, O, and the reading of v. Our form will now be:

M	O	v	*True voltage*	*Error*
M_1	O_1	v_1		
M_2	O_2	v_2		
M_3	O_3	v_3		

Here, again, we know that the current in the circuit, I, is equal to $\frac{1{,}000H}{MR_3}$. Therefore the drop across $O = v = \frac{1{,}000H}{MR_3} \times \frac{OR_3}{1{,}000}$ which simplifies to $v = \frac{OH}{M}$, and we can fill out the true-voltage column and obtain the instrument error.

To check up a milivoltmeter, the hook up includes MV. The galvanometer is balanced as before. Then the pointer, B, is moved to successive points and the following recorded for each point:

M	N	MV	*True milivolts*	*Error*
M_1	N_1	MV_1		
M_2	N_2	MV_2		

We now have practically the same problem as before. I is still equal to $\frac{1{,}000H}{MR_3}$, and the drop across N of $R_4 = \frac{1{,}000H}{MR_3} \times \frac{NR_4}{1{,}000}$ which simplifies to true milivolts $= \frac{k_1N}{M}$. The true milivolts are then placed in the form above and the instrument error is readily obtained.

Now we have a standard voltmeter, V, which may be used to check up other voltmeters of similar scale; a standard low-voltage voltmeter, v, and a standard milivoltmeter. The only one that offers any problem is the milivoltmeter.

As stated above, most ammeters of any capacity such as would be used in a submarine consist of a shunt and a milivoltmeter with its connecting leads. The shunt is simply a low-resistance fitting, placed in the line, whose resistance, and therefore drop-per-ampere, is known. It is built for a B volt drop with a C ampere load. Knowing B and C, it is obvious that each milivolt drop across the shunt gives a reading of $\frac{C}{B}$ on the milivoltmeter, this reading being marked in amperes. Now, if we measure the drop across the shunt with our calibrated milivoltmeter, we know that $MV \times \frac{C}{B}$ = true amperes in the circuit, and we can thus check the ammeter as a whole, using the ship's load and leaving the instrument and shunt in place.

There are a few points to remember in using this scheme; otherwise all is plain sailing:

(1) When using the wheatstone bridge to measure the resistances R_1, R_2, R_3, etc., do not forget to deduct the resistance of the leads from the bridge to the resistance being measured from the reading obtained, particularly in the case of R_3 and R_4.

(2) Use only the leads which belong to the milivoltmeter, MV, and label those leads for use with that instrument alone.

(3) Keep K open until the galvanometer, G, is balanced, then close K and get a delicate balance. If this is not done it will probably be necessary to get a new standard cell. They cost about $24.00 each so it behooves one to be careful.

The total of all apparatus required is:

(1) A wheatstone bridge. The standard test set works beautifully.

(2) A standard cell, Weston preferred.

(3) Resistance wire as shown in figure and explained therein. The resistances can be made up to suit your own convenience. It should have a low temperature coefficient.

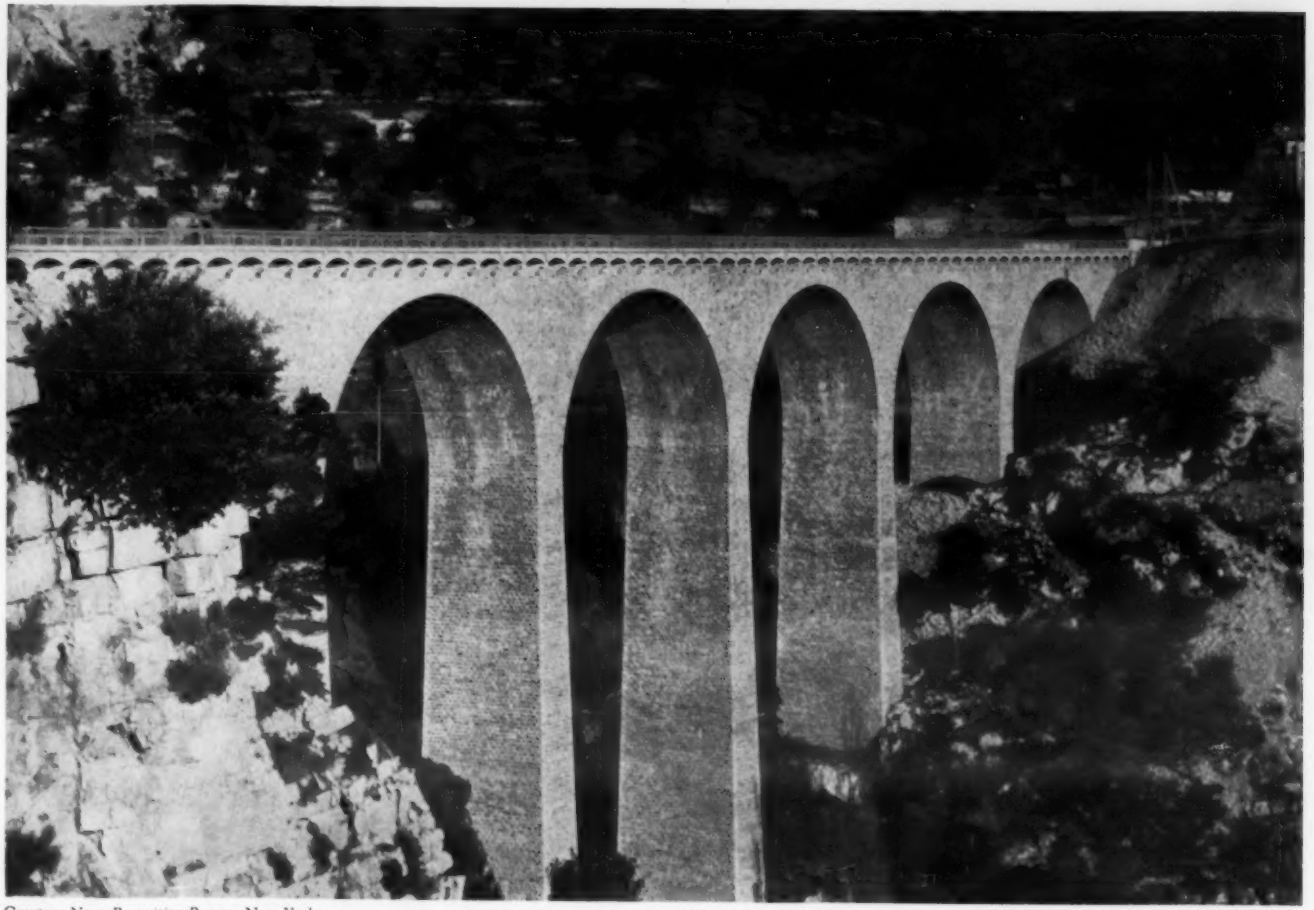
(4) Bare copper wire for R_4.

If you have any meter-calibration problems, the above described set and a little patience will solve them and you will be blessed by all submarine kind.

Courtesy Navy Recruiting Bureau, New York

VENICE, ITALY

Early in February, 1909, the fleet was in the Mediterranean, visiting various ports preparatory to starting the last leg of this memorable cruise.



Courtesy Navy Recruiting Bureau, New York

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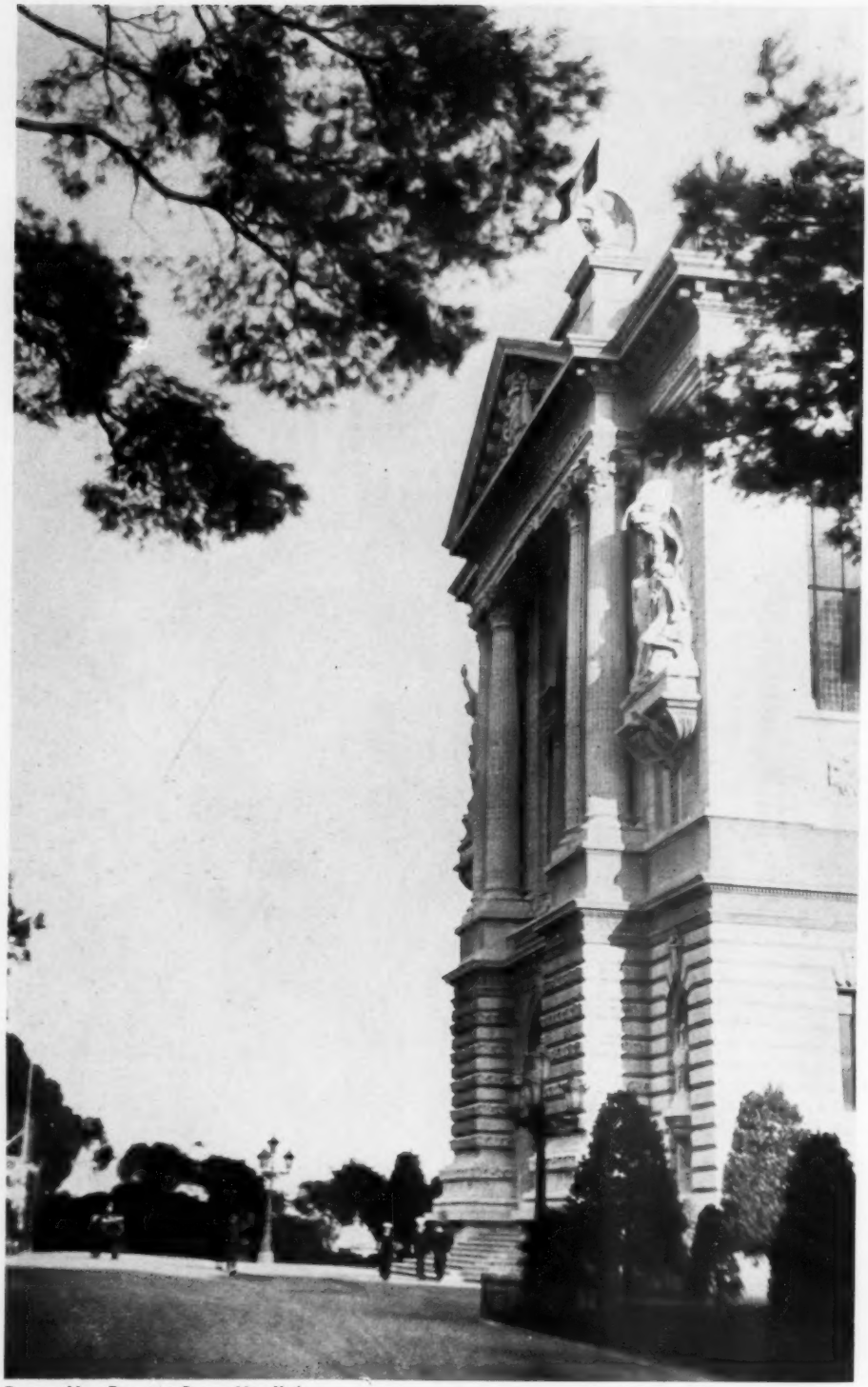
EZE VIADUCT FROM THE GRAND CORNICHE ON THE RIVIERA

Courtesy Navy Recruiting Bureau, New York

PALAIS LONGCHAMPS, MARSEILLES, FRANCE



Courtesy Navy Recruiting Bureau, New York

MUSEUM OF OCEANOGRAPHY, MONACO

Courtesy Navy Recruiting Bureau, New York

MEMORIAL TO WORLD WAR DEAD AT GIBRALTAR

Courtesy Navy Recruiting Bureau, New York

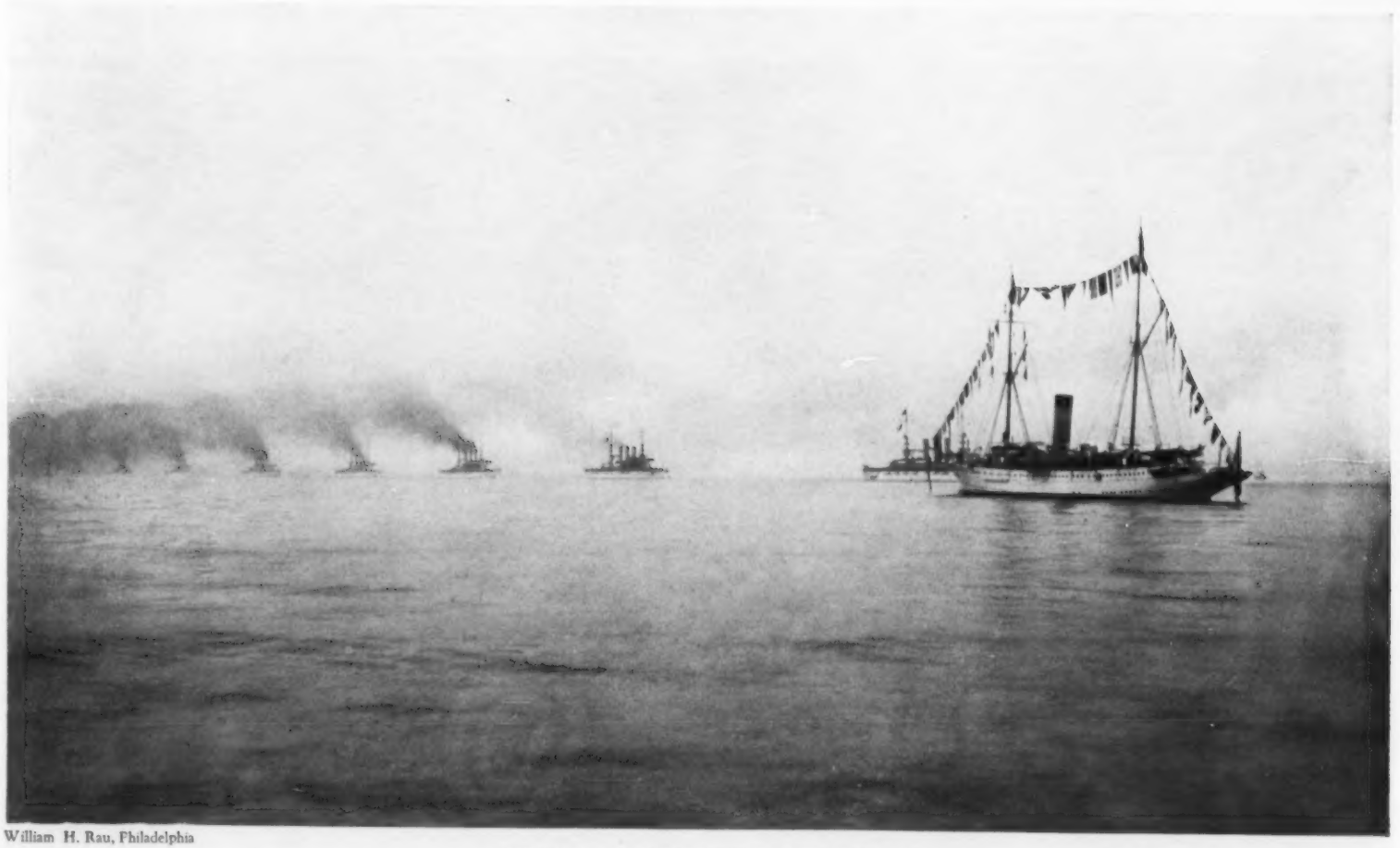
ENTRANCE TO PALAIS LONGCHAMPS, MARSEILLES, FRANCE

Courtesy Lieutenant Commander Richard Wainwright, U.S. Navy (Retired)

VIEW OF GIBRALTAR FROM LA LINEA

Courtesy Lieutenant Commander Richard Wainwright, U.S. Navy (Retired)

THE WATER FRONT AT GIBRALTAR
From the anchorage of the U.S.S. *Connecticut* in 1909.

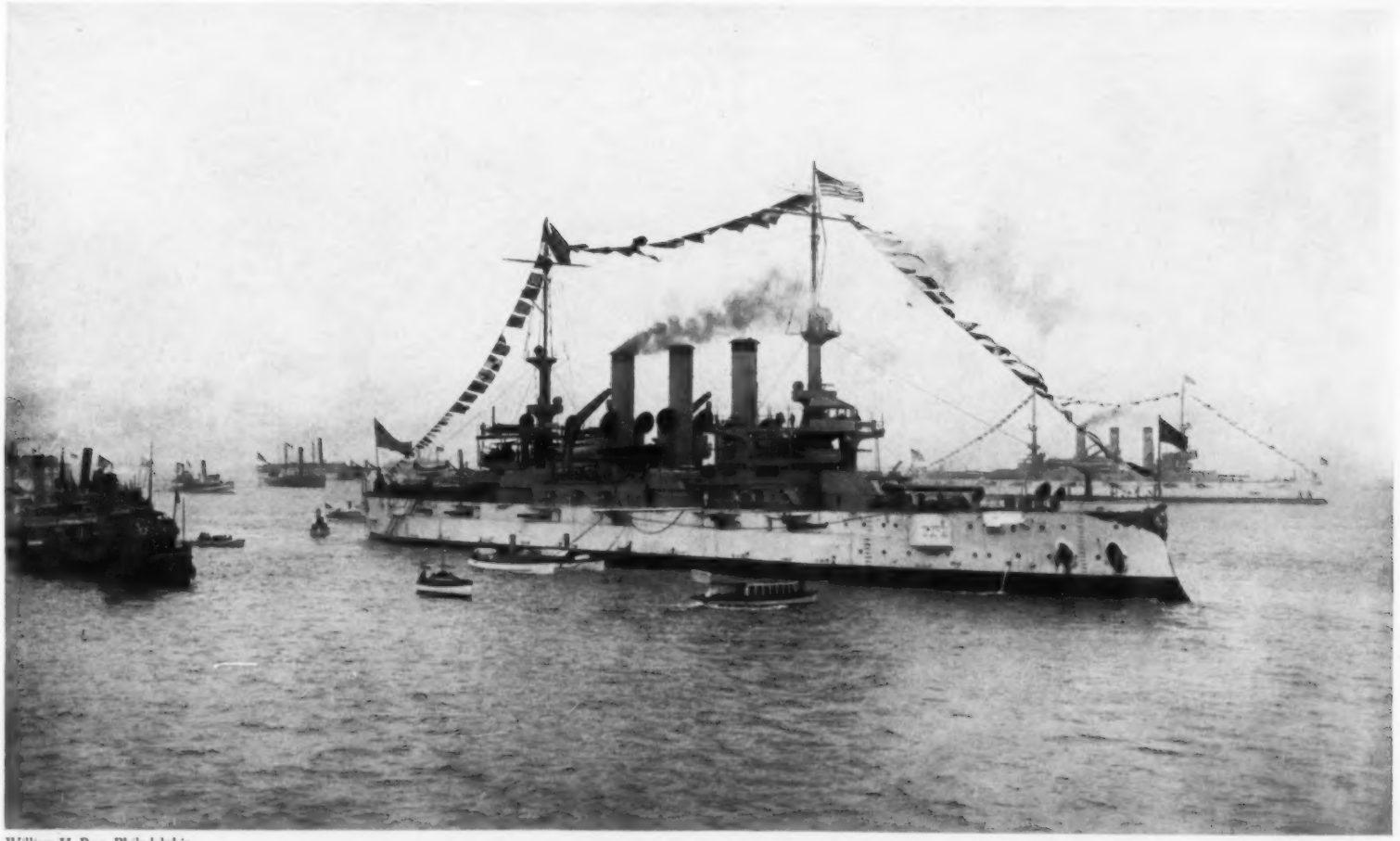


William H. Rau, Philadelphia

PRESIDENT ROOSEVELT WELCOMES THE FLEET
Fleet entering the Capes of Virginia, 1909, after its 46,000-mile cruise.

International Newsreel

THE FLEET AT ANCHOR, HAMPTON ROADS, VIRGINIA, FEBRUARY 22, 1909



William H. Rau, Philadelphia

PRESIDENT ROOSEVELT BOARDS THE *CONNECTICUT*, HAMPTON ROADS, VIRGINIA, FEBRUARY 22, 1909

Courtesy Lieutenant Commander Richard Wainwright, U.S. Navy (Retired)

PRESIDENT ROOSEVELT BEING RECEIVED ON BOARD THE *LOUISIANA*

Courtesy R. M. Booker

THE "OLD" CHAMBERLIN HOTEL AT OLD POINT COMFORT, VIRGINIA

Famous rendezvous for officers of the Army and Navy, and filled with wives and sweethearts at the time of the return of the fleet, February 22, 1909

Courtesy Mrs. R. M. Booker

THE BURNING OF THE "OLD" CHAMBERLIN HOTEL
A remarkable picture of the burning of this famous hostelry, shortly after the World War.

THE BURNING OF THE "OLD" CHAMBERLIN HOTEL

A remarkable picture of the burning of this famous hostelry, shortly after the World War.

Courtesy Luke Glennon. Photo by Underwood & Underwood, Washington, D. C.

THE NEW VANDERBILT-CHAMBERLIN, AT OLD POINT COMFORT

Erected on the site of the old Chamberlin Hotel and rapidly reclaiming its prestige.

Courtesy the late Mrs. G. E. T. Stevenson

THE TRACK OF THE FLEET ON ITS CRUISE AROUND THE WORLD, 1907–1909

Uses *of* Aircraft *in* Naval Warfare

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MANY false conclusions have been drawn from the results of the use of aircraft in the World War. Some striking incidents of success are given exaggerated importance; some failures are considered conclusive proof of the limitations of the use of aircraft.

Corbett writes: "Officers no longer look upon history as a kind of dust heap.... They go to it as a mine of experience where alone the gold is to be found from which *right doctrine*—the soul of war—can be built up." The errors in our conclusions have been made because we were unable to study the problem of aviation in war time with the right doctrine in mind.

Prior to 1914, war between nations was waged only on land and sea. The World War added another theater of operation—the air. Where once only two dominions were considered in the strategical and tactical estimates of the situation there is now a third one to be considered. Should it be studied separately or in conjunction with the others? Will aircraft in future wars be so decisive that our armies and navies will merely become the protectors and the aids of the air service? These questions may best be answered by a careful study of the possible use of aircraft in naval warfare, together with their limitations and capabilities. Let us inquire first into the strategic characteristics, or the limitations governing their employment.

The first limitation is a physical one, and it is the greatest one affecting the employment of heavier-than-air machines—the law of nature which requires that they must remain in motion in order to float or fly. Upon loss of motion they must land; then they lose all the characteristics which warrant their employment. Their usefulness depends upon flight and that can never become completely reliable.

The next limitation is that of weather. Meteorological conditions which render aircraft operations impossible vary with the locality and time of the year. A nation whose principal arm is aircraft, can only fight in favorable regions and at opportune times. At inopportune times and in unfavorable localities it would be at the mercy of any enemy with a stronger fleet or army.

The inability of a plane to maintain a continuous bombardment or fire on its objective is an equally unfortunate limitation. It must return to the carrier or airdrome for a new supply of bombs or ammunition. The allowance within its physical ability to carry is small. Hence continuous bombardment of an objective will require an enormous number of planes.

The fourth limitation is that of radius of operation. True, flights have been made of thousands of miles. The progress of aviation with respect to radius of action has been tremendous, but the results must not be confused with the capabilities of aircraft, suitable for war purposes, carrying bombs and guns. The maximum radius of action for bombers has been developed from five hours flight (the figure at the close of the World War) to about ten hours at the present day. To reach an enemy beyond this range, it is necessary to transport planes on carriers. These carriers will require battleships, cruisers, destroyers, submarines, for their protection at night, and in the day time, when the weather conditions are unfavorable for their protection by aircraft.

Other equally important limitations are: (a) the inability to alone maintain an effective scouting line against surface craft, unless planes are kept constantly on the scouting line; and (b) the lack, to date, of a scouting plane that combines speed, long radius, and a strong enough armament to enable it to gain information in the face of opposition. The problem of speed, radius, and armament in aircraft is the same as for cruisers; and the answer will always be the same—one of the desired

characteristics must be sacrificed to gain the other two in the desired degree.

Concerning the possible employment of aircraft, General Bird writes:

> The end of war is usually attained when one nation has been able to bring such pressure to bear on another that public opinion obliges the government to sue for peace. The fact that an air force can carry war into the enemy's country must necessarily give rise to the speculations as to whether pressure sufficient to end a war can be brought to bear on the spirit of a population by means of raids which would be directed against such objectives as railroads, factories, power stations, water works, mines, docks, harbors, etc., with the object of dislocating the life of the community. So long as the power of effective retaliation is possessed by a belligerent, it is, however, doubtful whether sufficient pressure will be exerted even by devastating incursions, unless means of destruction far more efficient than those now in existence are employed; since experience so far has shown that apart from provoking the desire of defensive measures, a raid is, in general, likely to arouse the longing for retaliation rather than for submission. Retaliation will, in turn, produce measures of defense on the part of the enemy, so that even were mutual raiding to be at first adopted to the exclusion of other methods, the old principles of war would in all probability soon reassert themselves, and it would be found that the natural step toward winning the war was to establish superiority over the enemy's armed force. . . . . It seems, then, the principle that war is best ended through the defeat of the enemy's armed forces will still be observed and that the primary objective of aërial strategy will be to obtain supremacy, if possible, but superiority, at any rate, over the enemy's armed air forces; and that raiding with the objective of spreading terror will be secondary in importance until military objectives of victory in air, and on sea and land have been achieved. . . . .
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> War is a combination of movement and hitting —the movement being necessary to reach the objective; the hitting, to gain it or to prevent the enemy from doing so. Airmen can strike and keep on doing this, but their striking is somewhat in the nature of raid and scuttle, and it is therefore doubtful whether they will be able to acquire control over hostile areas, which must often be effected before decisive successes can be attained. It is also more than doubtful whether airmen alone could stop a well armed fleet and army which were supported by aircraft, and in the end the army would seize the bases, airdromes, and work shops on which aircraft, like all machines, depend for maintenance of their motive power. Airmen may oblige troops on land to fight behind armor as seamen do, but for many years to come nations will, it seems, as at present, rely on navies and armies as well as on air forces to effect their security and that of their interests.

How must this reliance on aircraft be fulfilled? What is their mission? We have seen that alone they cannot overcome the will of a first-class power; that they are unable to turn an advantage once gained into permanent benefit. Their physical characteristics limit the scope of their operations. They must be transported by carriers to reach an enemy beyond a distance of several hundred miles. They must have the same carriers or depot ships for their upkeep, their fuel, and ammunition supply. They are not able to protect their carriers at all times, and hence must depend upon battleships, cruisers, destroyers, and submarines for their security. Therefore they must have the assistance of the navy in their operations.

Let us consider them as a unit in such a combined naval force. The potential strength of this force will be increased by added capabilities in the employment of aircraft. The range of its guns will be hundreds of miles instead of a few. Its security will not depend upon the seaman's horizon; instead its eyes may be hundreds of miles ahead. The aircraft will be secure in all conditions of weather and in any region. They may strike an enemy at a distance far beyond their radius of flight. The carriers or depot ships upon which they depend will always be secure. Their capabilities are increased by the strength of the navy with them.

As a part of such a force their mission must be the mission of the combined force.

Having derived this mission let us study some possible courses of action in its execution. Their value, chance of success, and importance will show whether or not this mission is a sound one. How may they best be used with the navy, and vice versa.

The study of war seems to give us certain basic principles for its conduct. These are the background upon which a picture of the plan may be tested for possible weakness, and the subconscious guide for its execution. They may be called Objective, Offensive, Security, Concentration, Economy of Force, Movement, Surprise, and Cooperation. Whether the force considered is land, naval, or air, these principles are applicable, for the combined military forces of a nation in war aim at a common goal, the defeat of the enemy's resistance, with the consequent maintenance of policy of the victor. Let us take these principles separately and apply them to the use of our aircraft both as a guide and a measure of

profitable employment, for the art of war has demonstrated no better principles.

The Principle of Objective

This is the first and most important principle, for it is inseparable from the mission or the task at hand. As shown in the previous discussion, the primary objective should not be the vital centers behind the enemy's lines or frontiers. Such a campaign will leave our own land open to similar raids and reprisals with equal or greater damage, depending upon the geographical location of the vital areas. The enemy's air forces would be free to assist the operations of their army and navy, while our military and naval forces would be without the assistance of aircraft. Such a campaign would result in the development of strong defensive measures by the enemy, in the face of which it is doubtful that an air force could accomplish decisive results.

Accomplishment of such a mission promises some successes, but not the decisive results which should be our aim. Let us look further. Aircraft are the new eyes of the army and navy. Positions of enemy troops, batteries, supply depots, ships, fleets, and bases may be by means of air scouts revealed to both belligerents. Such information will enable a fleet to avoid engagement under unfavorable conditions, will enable an army commander to attack the weak points in an enemy defense or strengthen his own weaknesses when superior enemy concentrations before them are apparent. The spotting by aircraft increases the range of both naval and land guns by increasing the distance at which their fire may be controlled.

If the air forces of one belligerent can destroy the air force of its enemy, then the military and naval forces of the unfortunate belligerent will be without the assistance outlined above. The vital areas at home of the victorious nation will be safe from raids. The enemy's vital areas will be without the defense of aircraft, therefore more decisive results may be obtained from bombing operations undertaken after the enemy has been defeated in the air.

Some of the principal functions of naval aircraft are listed below in the order of their importance:

1. Offensive action against enemy aircraft.
2. The resulting protection of own fleet from enemy aircraft.
3. Scouting.
4. Spotting.
5. Bombing and torpedo attacks on enemy war and merchant vessels at sea.
6. Bombing and torpedo attacks on enemy ships in port.
7. Bombing attacks on enemy naval bases and yards and ports.
8. Operations to support military landings.
9. Enemy merchant vessels at sea and in port and important enemy seaports would be an important objective in case a power had sufficient naval strength to enforce an economic blockade upon another; and enough planes to carry out the bombardments without sacrificing control of the air in other vital areas.

The operations of the naval air force must support the mission of the naval unit with which it operates. The importance of the agreement of the plan for air operations with the mission of the naval force with which it operates cannot be emphasized too strongly.

Too many objectives or too strong a one for the force available are equally great mistakes. Lord Grey of Falloden said: "The errors of strategy in past wars may be expressed in two words—'Side Shows.'" They must be avoided in the choice of the objective.

Principle of the Offensive

Decisive victory comes only through the spirit of the offensive which must permeate a fleet and inspire its leaders, through whom the resulting power must be intelligently and efficiently applied.*

Air superiority or control must be had in any area where extensive air, land, or naval operations are planned. It is a vital initial step to secure their success.

There is only one way in which this can be attained: the offensive—in which the enemy's aircraft in an area are destroyed faster than he can rush in replacements or beyond his ability to replace the destroyed planes. Intensive patrols by pursuit ships, in a number superior to the enemy's, will soon drive the enemy out of the air. Intensive bombing raids on his carriers, air-

* *Principles of War Applied to Naval Warfare*, Naval War College pamphlet.

dromes, and important military centers in the vicinity will force his planes back in the air where they can be fought and destroyed. When the strategic plan undertaken requires general and lasting control of the air the enemy's sources and means of production should be bombed and destroyed as well.

A force on the offensive possesses the great advantage of requiring the enemy to displace his own forces intended for offensive operations, by requiring them to assume a defensive rôle. The sporadic air raids by the Zeppelins and bombing planes at opportune times resulted in the maintenance in the British Isles of several thousand troops, and many aircraft sorely needed on the front. Though the physical damage inflicted by the German offensive tactics was small, their effort was also small, but the resulting employment of valuable forces for home defense was a vast benefit. It was not until 1917 that the British air ministry and general staff reached the conclusion that the proper defense for London was a strong offensive bombing campaign against German airdromes. For three years the Germans, in spite of all defensive measures, had reached their goal, but after the British offensive operations the attacks weakened and became fewer in number.

Adherence to the Principle of Offensive has another strong advantage in its favor. It raises the morale of the forces adopting it. It imbues them with the spirit that they are bound to win and brings confidence in their ability.

Even when the action is a defensive one the spirit of the offensive may still be profitably obeyed. If the enemy's planes are attacked before they reach the near vicinity of their objective, they may be made to conform to the defender's plans, causing a change in the operation, with resulting confusion. A change of plans in an air operation while it is in progress will find many of the units ignorant of the new plan. The leader cannot make his new decision known to his forces with the clarity that may be done with naval vessels.

The advantages of the offensive course of action were not realized by the British in their air defenses of London until late in the war. Then the German bombing formations were attacked in the air, long before they reached their objectives. The records of these later flights show that where from twenty-five to forty planes started only a few ever reached London; the others either turned back, or chose less important objectives for their bombs.

The Principle of Superiority

In the execution of a plan the Principle of Superiority must be observed. It means the concentration of a force tactically superior to the enemy's in the same area. It does not require superior forces in all areas, but only the vital ones, and where contact is to be expected, and a decisive result desired.

As previously stated, air strength of two naval forces in contact may not usually be increased. Tactical air superiority must be acquired by the sound disposition of forces in the vital areas—and the avoidance of "side shows"—using planes for only necessary and important purposes, and planning their operations so that the units may exert a combined offensive effort.

This tactical superiority does not necessarily mean one of numbers. Superior skill of the pilots and performance of the planes and equipment will offset the advantage of numbers. This was clearly demonstrated on the Western Front in April, 1918, when the Germans brought out the Fokker type triplane for pursuit purposes. Its superior performance enabled them to deny the Allies any information of the enormous troop concentrations which took place immediately behind the front lines prior to these offensives. Yet, the Allies had a two to one superiority in number of aircraft, along the front.

Some further results of the World War illustrate the advantageous results of superiority.

General Ludendorf states in his work, *The General Staff*, that during the Battle of the Somme in 1917, the Allied air superiority increased the difficulty of the German defense. The German planes were unable to observe the movements of the Allies, and the Allied planes attacked their front line troops, reserves, and supply depots.

During the period of Allied air superiority towards the end of the war the German air losses were enormous in comparison with those of the Allies. In August and September of 1918 the Allies lost 489 planes while the Germans lost 1,962.

The Principle of Coöperation

The next important principle of war which should be applied in the use of aircraft is that of coöperation.

Unity of action towards the accomplishment of the mission of the entire force is necessary in order to obtain maximum effort. A naval force is made of many component parts, one of which is the air. The mission of the air force must coincide and its plan must coöperate with that of the surface ships. This is obtained through loyalty to the leader's plan, and a thorough understanding of the undertaking and the part each unit of the force is to play. When the plan is changed, when situations arise which demand unexpected actions, if possible such information should be given to the air forces. It will not be easy to do this with forces already in the air. Maneuver rules allow a degree of communication between ships and planes that is idealistic. Too much confidence should not be placed in this form of communication. In actual practice it will be found that such action must depend primarily upon the initiative and judgment of the air force unit commanders in the air, which should be based upon the principle of coöperation.

The Principle of Simplicity

The Principle of Simplicity demands as strict obedience in aircraft operations as in those of surface vessels. It applies to organization, orders, instructions, technique of maneuvers, and especially communication systems, and the strategical and tactical plans of operation.

Simplicity in organization will serve to create a higher degree of efficiency, in both material and personnel, and make the units more quickly available for action, as well as giving better coördination of effort. The organization of tactical units should not be carried beyond the size that can actually be controlled efficiently in the air by the squadron leader. Flight groups should not be composed of units or types that cannot operate together efficiently.

The reasons requiring simplicity and clearness of orders and instructions are the same regardless of whether the forces concerned be army, naval, or air. An order should be clear, its meaning capable of only one construction, and the initiative of the subordinate should be respected.

The degree of latitude allowed to his discretion depends upon the subordinate's training and indoctrination. War instructions have been prepared and battle formations developed from practical experience that will best fit tactical situations which are most likely to arise. If subordinates have been trained in the use of these instructions, they may be omitted, not forgetting that operations which would be simple for highly trained personnel should not be attempted with green pilots. An example of this is found in the training of German bombing squadrons before any night bombing raids were undertaken. The first raids were simple in plan, while successive ones that were equally as successful were more complicated.

Communications are just as necessary for the success of a naval operation as good gunnery and sound tactics. The Battle of Jutland showed many instances where the fruits of opportunity never ripened because important messages failed to get through. The seaplane sent up by the *Engadine* was not able to get its reports through. Engine trouble prevented thorough reconnaissance, and the information it gained was not delivered.

Communication between ship and planes and vice versa is difficult under the most favorable conditions. It depends upon a simple plan, efficient operating personnel and material, and careful calibration of ships' and planes' radio sets. The value of calibration cannot be overstressed, to one who has tried to communicate between ship and plane when many others are operating at the same time. No radio plan should make it necessary for a plane to communicate on more than one wave length, otherwise one of the messages will be off in frequency, causing interference and confusion. Communication between pursuit planes of different units must be by visual method. Anything but Very pistol stars is beyond consideration. Visual communication between planes and ships may be by some such method as smoke bombs, or dropping of messages on deck.

Due to the difficulty of communication between planes, the operating plan should be as simple as possible, and meet the greatest number of possible courses of ac-

tion without requiring a change of plan. A complicated plan is likely to cause confusion and failure.

The Principle of Economy of Force

Guidance by this principle is one of the most difficult problems facing a force commander. It is so closely related to the principles of Objective, Superiority, Movement, Surprise, and Security that it must be considered with them in order that they may be followed as well.

The Principle of Economy of Force does not mean the use of as little force as possible for an undertaking. When defined in other words, as the principle of distribution of forces, the meaning is clearer, and more definite. Enlarging upon the definition, we see that it means the employment of as great a force as possible for an undertaking without weakening the forces at other vital points to the extent that reverses there would outweigh the resulting success of the project. Forces at unimportant points or used in objectives which contribute nothing to the winning of the action are forces wasted. So far forces drawn into a concentration to give superiority beyond that necessary at the sacrifice of forces needed at other vital points.

The ease and rapidity with which air craft may be moved, assist in conforming with the Principle of Economy. The most economical use of forces is gained by concentration. It took the Germans three years to learn this lesson over again. The Battle of the Somme found the German air service under the command of the individual army commanders. As a result when the British drive opened against the German first army, its air forces were not sufficient to deny the British air superiority. Much-needed forces were rendering no assistance in the quiet sectors. The hymn of the German infantryman was, "God punish England, our air forces, and our artillery." The German High Command saw the necessity of reorganization. Only such air forces were assigned to an army as necessary for normal services; the remainder were organized into mobile squadrons and shifted from point to point where need of air superiority was imperative. The British air superiority was soon overcome.

Such an organization and concentration is more necessary for naval air forces prior to beginning a naval operation than for an army's operations. The success or failure of the naval operation will be decided in a few hours of battle while the land struggle may last days and months. Once the two naval forces have joined action, only the forces in contact will be engaged, while on land, reserves may counterattack and regain the advantage lost to the enemy. In naval warfare there are not many instances where more than one operation of major size and great importance was underway at one time. Therefore the air units of forces not employed in the project should be used where they will contribute to the success of the venture.

Concentration of air forces results in economy of force through reduction of losses. In the first great air battle in the World War, Baron von Richthofen's squadron, organized for concerted attack and trained to attack as a unit, intercepted a British daylight bombing raid guarded by several pursuit squadrons, on February 21, 1918. In the air *mêlée* following, between seventy and eighty planes were engaged. The British lost thirteen planes, the Germans one. The German attack was a united one, the British defense was not, and a loss of thirteen to one was the result.

The Principle of Surprise

In *Principles of War Applied to Naval Warfare*,* we find the following: "He who would employ surprise successfully must:

"1. Have much knowledge.

"2. Know his adversary.

"3. Deny his adversary knowledge of himself. . . . .

"In tactics information of the enemy and secrecy as to our own situations are prerequisite to surprise. . . . .

"Secrecy is essential to most complete surprise. . . . . "

Secrecy of movements and intentions are absolutely essential in the employment of the Principle of Surprise in warfare. The value of this principle need not be discussed —only one point will be emphasized. The force using surprise will never be surprised by the enemy, for surprise operations depend fundamentally upon the denial of information to the enemy.

In naval warfare aviation may be used in three ways in the execution of a plan

* Naval War College pamphlet.

embodying the Principle of Surprise: to gain information of the enemy; to deny him information of own movements; and as the striking weapon.

As a general rule a plane may see a ship ten miles before the plane may be seen. Unless the enemy is guarded by an efficient aërial patrol beyond the range of a plane's visibility it may easily obtain the desired information of enemy's strength, position, and disposition. If the enemy is guarded by a strong air patrol, low visibility, with the usual low hanging clouds, will afford the desired protection for aërial scouts. If circumstances make the need of information an urgent one then a force strong enough to break through the enemy's air patrol and obtain the desired knowledge must be employed. Such a movement destroys the element of surprise. This will rarely be necessary—a plane arriving in the vicinity of the enemy just at dusk may easily escape in the coming darkness.

Only one other class of war vessel affords the opportunity to obtain easily unobserved information of the enemy, and that is the submarine. The slow speed and defenselessness of the submarine handicap it. Aircraft may obtain more information, more easily, and more quickly than may be obtained by any other means.

Before a surprise operation may be successful, the enemy must be denied all information of it.

Planes scouting beyond the radius of surface visibility from warships may see more, and cover more area than surface scouts. Enemy vessels in a vital area may be quickly detected, and the surprising force may then either maneuver to avoid contact, or drive off the enemy ships. Here again aircraft offer a profitable arm. One surface scout would have slight chance against an attack from a torpedo or bombing squadron.

The intentions and presence of the surprising force must be concealed from the enemy in the air as well as on the water.

The safest measure to insure this, though not always possible of employment, is to shape a course that will lie outside the radius of operation of shore or tender-based aircraft; to enter this danger zone only at night. Other measures must be used at the same time. Scouting vessels use planes to increase their radius of visibility, and to cover the area more effectively. To deny information to these scouts an air patrol both above and below the cloud ceiling must be maintained from shortly before dawn to shortly after dark, at a distance from the screened force greater than the radius of visibility from a plane. The stronger this screening air patrol the less opportunity the enemy will have to obtain information. Aircraft are a double-edged weapon; they offer the same opportunities to both sides. The one employing them most advantageously will benefit the most.

Let us next investigate the opportunities offered by aircraft as a weapon of surprise.

High-speed carriers afford a means of plane transportation in short time, and will allow sudden concentration of air superiority at distant points beyond radius of action of the planes.

The ability of planes to make bombing and torpedo attacks against both naval and military armaments may not be contested any longer. Through them a force secure from attack by surface ships behind protecting mine fields and land fortifications may be successfully attacked, even if their air defense be strong, for the speed with which a surprise air attack may be delivered will allow its execution before defensive measures strong enough to defeat it can be brought into play. An especially inviting objective for such tactics will be an advance force or fleet which has seized, and is operating from, a naval base in the vicinity of the enemy's home land in an overseas campaign. Equally valuable are home naval yards and naval bases.

Such attacks must be delivered in force, and with a force strong enough to insure command of the air during the time of the attack. They should arrive at either dawn, dusk, or dark in order to render enemy defense more difficult. During the day the effectiveness of an antiaircraft fire is immeasurably increased, and defense aircraft may render strong resistance. Night, even with the attendant difficulties of night flying, offers the most favorable opportunities for success. Planes may bomb accurately during the dark if parachute flares are dropped from above the bombing altitudes by other planes. Naval antiaircraft defense cannot be as thoroughly organized and developed as that on shore. Night will increase its ineffectiveness. Another point

in possible defenses to be considered when the time of a surprise air attack is chosen is the slight opposition other aircraft may offer at night. Visibility between planes drops to about 500 yards under the most favorable conditions. Contacts are only chance, and then easily lost. Coördinated tactics for pursuit attack cannot be carried out. Planes must fight singly. Individual successes are only lucky encounters. Summing the insurmountable difficulties attendant upon night combat between aircraft, we find that our own casualties on landing may be expected to exceed the damages we may inflict on an enemy in the air. Besides this, our own aircraft engaged in a general *mêlée* with enemy bombers will prevent the best use of antiaircraft guns or subject our own planes to the same possible damage as the enemy's. The personal accounts of aviators on both sides in the World War who attempted to fight bombers in the air in the vicinity of their targets all strongly stress the point that their own antiaircraft fire prevented their reaching the enemy's formations. Either one form of defense or the other may be expected and neither will be effective. Protection lies only in the obscurance of the target with smoke, and if the attack is enough of a surprise it may be completed before enough smoke may be laid to be of any value.

The above example and discussion are given to illustrate the capabilities in the use of aircraft as a weapon of surprise. The best strategy in war employs all weapons in every possible manner and at every possible time. This valuable capability should not be forgotten.

Principle of Movement

"The Principle of Movement applies to the attainment of a favorable position with reference to the enemy."* To attain this goal, a fleet may find it necessary to pass through a phase of the engagement when the advantage lies on the opponent's side. In such a situation, a commander must weigh the results to be attained with the losses expected, and use every means within his power to lessen the damage the enemy may inflict while his force is in a disadvantageous position. Let us study the opportunities offered by aircraft for this purpose.

The initial phases of a fleet action begin with the approach before deployment. At this time, the enemy's submarines may be expected to be on the surface, cruising to take up favorable positions for submerged attack on the battle line. Patrol planes carrying bombs can drive these vessels under the water and keep them there, hence limiting their radius of operation. After the submarines are forced under, an air patrol dropping depth and smoke bombs may assist the fleet in passing through this dangerous area.

During the approach and deployment, the rapidity and distance at which torpedo planes can operate offer an opportunity for an early attack with a possibility of damage to the enemy battle line before the engagement opens.

Let us study the next phase of the engagement, deployment. Low visibility may force this suddenly upon a fleet, with the attendant disadvantages of ineffective fire and confusion as was the case of Admiral Beatty's battle cruisers at Jutland. Smoke screens laid by aircraft are ideal for protection during this disadvantageous moment; their uses and advantages will be separately discussed later.

When the officer in tactical command decides to use his surface torpedo craft for attack, they should be assisted by the coordinated attack of his torpedo planes. These craft, due to their speed, may reach a position on the disengaged side of the enemy that the surface craft could not possibly obtain. Smoke-screen planes can be used to cover the approach of both the destroyers and torpedo planes. This method of protection should always be used in an aërial torpedo attack unless low visibility, mist, rain, or already existent smoke will afford the same relief.

After fire has been opened by the enemy, his battle line evolutions must be restricted in order to maintain its maximum effectiveness. This is the most opportune time for a bombing attack on his capital ships. The bomber's target must be on a constant course and at a constant speed during the time the plane is making the last part of its approach, otherwise the results will depend upon luck. A fleet observing the approach of a bombing attack, in absence of

* *Principles of War Applied to Naval Warfare.*

other protection, must zigzag in order to defeat it. This will decrease the effectiveness of its fire.

At this point, it is well to discuss briefly some possible defensive measures against both torpedo and bombing attacks during an action.

The torpedo planes are least vulnerable from pursuit aircraft when near the water. Surface screens at proper distances from the main body may keep the torpedo planes in the air at an altitude where they may be attacked during their approach. The range of torpedoes that aircraft now carry is comparatively short. The plane must be within twenty-five feet of the water when launching the torpedo. A destroyer screen on the disengaged bow and side at a distance of 2,000 yards from the battle line can with machine-gun fire completely defeat a torpedo-plane attack, for such a screen can keep the planes at an altitude above twenty-five feet and beyond the range of their torpedoes.

A continuous patrol of fighting planes strong enough to either destroy or defeat a bombing attempt must be kept aloft during daylight hours when attacks are possible, as a primary measure of defense. The strength of this protective force must be calculated on the basis that two fighters can destroy one bomber, and one fighter can keep one bomber from making its approach. The bomber cannot defend itself and make a successful approach at the same time. It must maneuver to keep the fighter from obtaining a position in its blind arc.

Should air defense fail or be lacking, zigzagging at high speed and smoke cover are the two most effective ways, in the present stages of development of antiaircraft fire, to defeat a bombing attack.

Smoke screens are a valuable aid in the execution of movement of surface craft as well as aircraft. Heretofore they have been laid only by surface vessels but now planes have many advantages for this purpose. They are briefly stated as follows: they cling better to the water; may be laid in about one-third the time of screens from surface craft; more chance of success in the operation, due to high speed of plane, making it more difficult to hit than a ship; may be laid with ease to windward of enemy, even though own force is to the leeward; may be laid with greater exactness with relation to surface ships.

The following are a few of the most important uses that are suggested for air-laid smoke screens:

(1) To protect the battle line while advancing through unfavorable ranges.

(2) To cover retirement or break off engagement.

(3) To cover a disabled ship from further punishment.

(4) During turning movement of battle line.

(5) To cover a portion of the enemy battle line in order to allow heavy concentration.

(6) To afford protection against light force and submarine torpedo attack.

(7) To cover the enemy and confuse his movement.

(8) To aid light forces and planes in torpedo attack, and cover bombing attacks and withdrawal of same.

(9) To protect surface craft from torpedo and bombing attacks.

(10) To cover mine-laying operations.

(11) To protect surface ships from shore fire during the debarkation of troops.

(12) To cover a landing force until it arrives on the beach.

A study of these possible uses for aircraft clearly shows that the major rôle of aviation in war is one of assistance, and that surface ships must have the assistance of aircraft in order to render their maximum effort.

The Principle of Security

This principle applies to operations undertaken to deny the enemy information from observation, to protect against surprise attacks, and have freedom of action without annoyance.

The part aircraft may play in such operations is limited to tactical scouting and screening due to their limited radius of operation, but they move more rapidly, cover long distances more quickly and can observe without detection more easily than any other type of craft. Besides these advantages they offer another equally strong argument for employment. Tactical scouting is usually undertaken in an area in which the balance of control is in favor of the enemy. The difference in the hazard in the employment of a few planes and an

equal number of surface vessels is the difference between a few lives and several hundred lives on the surface scout, between $100,000 and $20,000,000, the cost of the cruiser; between a fighting unit of negligible nature easily replaced and a valuable unit that cannot be replaced during the period of the war.

Operations in areas several hundred miles from the fleet or bases will require types of planes large enough to carry a complete navigational equipment, and enough men to obviate the fatigue factor. While it may never be practical to carry this type of plane on shipboard, the possibilities of future development must not be overlooked. With the present capabilities of planes the long-range scouts must operate from shore bases, and they must be augmented by surface scouts that can cover the vital area left unobserved by the planes after they have searched and returned to their bases. Such surface vessels in addition to performing this valuable service will also be able to render assistance to planes in case of emergency and forced landings, which will always be a part of flying as long as motors are used for aircraft propulsion.

When shore bases are not available for aërial tactical scouting operations or the area to be covered is beyond the effective range of operation of planes available, such operations must be undertaken by aircraft carriers, and the resulting loss of planes will be high if the operations require employment of planes near the limit of their ability.

Enough carriers should be assigned so that no planes will be employed beyond seventy-five per cent of their flight endurance except in cases of extreme emergency. In flight between the ranges of seventy-five per cent and one hundred per cent of endurance, the chance of breakdown rises from zero to practically one hundred per cent.

The advent of the airplane has introduced a new factor in screening. Control or command of the air will never be to such an absolute degree that it will be impossible for planes to enter an area, secure information, and depart safely. The more absolute the command the greater risk will be entailed in such an operation and the less chance of its success, but it will always be possible. The speed with which planes move and the relatively short distance they may be seen, make it so.

To deny the enemy such information then becomes the problem of making it impossible for him to launch aircraft. Cruisers and aircraft carriers capable of launching them must be kept at a distance beyond their aircraft's radius of operation by cruisers and aircraft. Such defensive measures are the only ones that will absolutely deny the enemy information from the air. An air patrol in vicinity of the fleet or convoy will further increase their safety.

This closes an outline of the use of aircraft in naval warfare. The application of the principles of war to aircraft was chosen to illustrate some of the ways in which they may be employed to assist the navy and the manner of employment which will promise the greatest chances of success.

All possible and profitable avenues have not been discussed. Those would fill never ending volumes, for invention and development will enlarge the field of future capabilities. But whatever these uses may be, they must be directed along a line of common action with the navy, in order to derive the greatest results and make use of all the possibilities aircraft offer as weapons.

The United States *and* Seapower

By Lieutenant H. E. Dow, *U.S.N.R.*

SINCE the beginning of time, historical record-making has occupied the mind and labor of a great many people. A dividing line between the period of impermanent record of event and accomplishment handed down by word of mouth, and permanent records engraved on clay and stone tablets, marks the beginning of our modern era, historically speaking. The study of known records, ancient and modern, shows a marked tendency for history to repeat itself under given conditions.

Even the most meager historical outline makes evident that, with the possible exception of the Roman Empire, aptitude for commercial pursuits has been a marked characteristic of all great nations.

As far as we can look into the past the sea presents itself as a wide common over which men could pass freely in all directions and on which men can always be found trading, traveling, and fighting. No nation has ever attained real world prominence or long continued in power and prosperity without power on the sea.

The first maritime race of which there is definite record is the Phœnician. Phœnicia was followed by Greece, Carthage, and Rome. The Romans were, strictly speaking, not a seafaring nation; they were driven to the sea to tie together their great empire and protect their lines of communication.

In the middle ages Venice, standing on the islands of a lagoon, invulnerable to invasion, the European gateway of the eastern trade, developed her sovereignty through the use of her trading and fighting fleets. She stood uncontested mistress of the known seas until the opening of the Cape of Good Hope route admitted English and Dutch ships to what had hitherto been a monopoly.

In 1660 the Dutch were a loose confederacy administered by what may be called a commercial aristocracy. Dutch ships pushed further and further abroad until they covered the world. Holland's fall from world power was due more to threatened invasion of her continental frontiers and to parsimony, than to any disaster which she suffered on the sea.

France was prevented from attaining real greatness on the sea through the necessity of defending her continental frontiers and also because she was obliged to divide her naval power to guard both her Atlantic and Mediterranean coasts.

England is a substantial body of territory originally pastoral and agricultural, which has developed tremendously along the lines of commercial and manufacturing activity. The sea has always been England's frontier. She sits in the center of her lines of communication, which extend all over the world.

Nations, like men, love gain, but the way in which gain is sought has a great effect on the greatness which they attain and on the duration of that greatness.

Spain and Portugal rose to greatness, but lost it in the mines of Mexico, Peru, and Brazil, because in their eagerness for the gold they could mine with comparative ease, they neglected manufactures and natural produce, not only in their colonies but at home, to such an extent that they were finally obliged to import even the simplest commodities.

England and Holland have been called nations of shop keepers. They were by nature business men, traders, producers, negotiators. Everywhere they strove to draw out and develop natural resources. At home they became great manufacturers; abroad, wherever they controlled, the land grew richer, produce multiplied in kind and quantity, and the necessary exchange between home and colony called ever for more ships.

The English, early recognizing that their national growth and even life depended on the security and increase of their sea-borne commerce, have always bent every effort to

foster sea-mindedness in their people and have encouraged the building and venturing of ships by favoring legislation and by prompt and ample naval protection guarding their shipping against alien encroachment. This policy of protection has always been held fundamental and nothing has ever altered its purpose.

The Dutch were at one time more powerful on the sea than the English. They were but slightly less dependent on the development of shipping for their national success. Aggressive and even predatory neighbors constituted a steady threat of invasion along their continental frontiers. As a result of this threat no vigorous, long continued policy for the protection and development of sea trade was ever evolved. The naturally stolid and more or less lethargic burghers were unwilling to continue ventures on the sea when they were obliged to risk war at home. Holland, consequently, has practically disappeared as a seapower.

The attention of a nation is directed to the sea through its geographical location, the character of its people, and by the necessity for trading its own products for those of other nations, that is, its growth in agriculture and manufactures. All nations, with the possible exception of Rome, which have attained world prominence have been commercial people who have had free access to the sea by means of sheltered and convenient harbors, and whose attention has been directed to the sea through the necessity of exchanging their own products for those of other nations. The greatness which a nation attains and the duration of that greatness is in direct ratio to the sea-mindedness of its people, the number and character of its ports, its invulnerability to invasion, and the vigor and consistency with which it has sought to keep the development of its shipping in step with the growth of its other commercial activities.

Nations as well as men nearly always display the prominent features of their future destiny in their earliest years.

Not long after the landing of the Pilgrims at Plymouth a shipyard was established on the south bank of the Mystic River in Medford, Massachusetts. From this yard the bark *Blessing of the Bay* was launched on July 4, 1631. This was the first ship regularly built in this country. On the occasion of her launching her owner, Governor Winthrop of Massachusetts Bay Colony, wrote:

> The general want of foreign commodities and a surplus of our own produce set us to work to provide a shipping of our own by which we could obtain those things which we had not, in exchange for those things which we had.

In 1640 an English periodical of the time makes note of the fact that forty ships of the American trade were owned and built by the Colonists themselves.

Thirty years later the chairman of the board of directors of the East India Company protested that "there is nothing more prejudicial, and in prospect more dangerous, to the mother kingdom than the increase in shipping in the American colonies." The industry was in such a healthy and promising state that in 1720 London shipwrights and shipowners petitioned the Lords of Trade that Colonial ships be excluded from all trade except with Great Britain and her colonies and that Americans be forbidden to build ships above a certain size. The Lords of Trade denied this petition and in 1768 389 vessels, of which 113 were square riggers, were launched along the Atlantic coasts of the Colonies.

The close of the Revolution found a very different state of affairs. Many American ships had been captured or destroyed during the war, others had been held closely in port and had sadly deteriorated. There were few ships of the new United States on the sea.

While the thirteen colonies had taken the name of United States, they could hardly be considered united in aim or purpose. The sense of nationalism had not been awakened; the idea of states' rights was rampant. Communication between the states was slow, difficult, and sometimes dangerous. In spite of these facts certain conditions existed which made the development of power on the sea inevitable.

Stretched along two thousand miles of Atlantic coastline, pent from continental expansion by vast and wild central plains and the Appalachian Mountains, and with few manufactures, the new states were obliged to look abroad for nearly all commodities, except those which their industry enabled them to produce on their own farms and plantations. As in the beginning, they were driven to the sea; obliged to create a shipping of their own that they might ex-

change those things of which they had a surplus for those things which they had not.

Even on the sea the ships of the young nation were beset with trials and hardships surpassing the natural difficulties of wind and wave. American ships were practically excluded from the European trade by the numerous restrictions and taxes imposed on them by nations having naval power. The young republic had no naval power, as, with the close of the Revolution, most of the ships comprising the Continental Navy had been sold or otherwise disposed of by the government.

Perhaps this was fortunate because it compelled American shipping interests to seek out and develop new outlets of trade and commerce. The result of this was the initiation of the China and East India trade. Necessity, hardship, and competition bred a line of shipbuilders, navigators, and sailormen that has never been excelled. The trade with the Far East grew by leaps and bounds in spite of persecution by English and French men-of-war which finally resulted in the War of 1812, and the less known and really unofficial naval war with France in 1798.

During the first half of the nineteenth century the United States was a seagoing nation. The best blood of nearly every community was given to the sea. American officers and sailors were higher in type, intelligence, and education than the seamen of any other nation in the world.

In an effort to support American shipping, Congress passed laws instituting discriminating tonnage and customs taxes on goods brought to this country in American ships and just previous to 1800 afforded a certain measure of naval protection by building six frigates. Entrance to the European trade followed the War of 1812 and shipping grew until in 1836 twelve vessels cleared the port of New York for Liverpool alone in a single day.

De Tocqueville in his work on the American democracy written in 1835, says:

> When I contemplate the ardor with which Americans prosecute commerce, the advantages which aid them, and the success of their undertakings, I cannot help believing that they will one day become the first maritime power of the globe. They are born to rule the seas as the Romans were to conquer the world.

American shipping in 1840 was as sound, well ordered, and efficient an example of human industry as the world has ever seen. This tremendous sea-borne trade which literally covered the world—for there was no port too small or far removed that the flag was not shown in it by some enterprising Yankee skipper—had its golden age between the years 1830-1860. During this period from seventy to ninety per cent of our foreign trade was carried in American ships.

After 1860 the decline of American shipping was steady and nearly as rapid as had been its growth. A combination of several factors effected this downfall. The 1850's were filled with the rumbles of an approaching civil war that left much of the nation prostrate. Shipping was paralyzed through four long years of strife.

Following the war came the age of railroad building, the Middle West and West were opened up, and their development offered unprecedented opportunities for the investment of capital. All interest was turned to the exploitation of the richest natural resources the world had ever seen.

In a nation as large territorially as the United States, a comparatively loosely bound organization of sovereign states, with a rapidly growing population, the center of which was ever moving inland, with a still slow, uncertain system of intercommunication, no unity of interest or purpose could be maintained. Each district and even each state was wrapped up in its own problems and knew or cared little about the problems of any other section. Only along the coast men still struggled to build and sail ships as their fathers had done. By the country as a whole the sea was neglected and to a large extent forgotten.

During this period of internal expansion European nations, especially England, were developing the iron ship which had been introduced for naval use in the Civil War. Possessing iron mines, foundries, and shops with numbers of well trained artificers, they were able to build iron ships that were larger, cheaper, and which could carry more cargo, ton for ton, and could be operated with less cost and smaller crews, than the wooden clippers produced in American ship yards.

At a time when Central and Western investment offered the surest and largest returns on the capital involved, when foreign ships were plentiful and only too willing to

carry the fruits of national development abroad, exchanging them for those things demanded by a people of rapidly growing prosperity, it was only natural that the United States should neglect its own shipping. Human nature has a tendency to follow the line of least resistance. It is only necessity that will gird men to face and win through against keen competition.

By the end of the nineteenth century the American flag had practically disappeared from the sea except when shown on an occasional man-of-war. In 1900 no ship left these shores for Russia, Sweden, Norway, Denmark, Holland, Italy, Hungary, Greece, or Turkey, and only two small sailing ships for France.

The early years of the twentieth century saw a few farsighted men laboring to reinterest the American people in a shipping of their own, but they met with slight success.

It required the cataclysm of a world war to arouse the nation. The sudden deflection of foreign tonnage from its normal custom of carrying American overseas trade to military and other purely national uses practically paralyzed commerce. The docks were piled high with goods awaiting shipment. Embargoes were placed on many classes of merchandise to prevent further congestion. Only the well stabilized Federal Reserve System prevented the most serious financial panics. The United States turned to shipbuilding almost as a man. Existing shipyards were greatly enlarged and new building ways were constructed in numbers along both Atlantic and Pacific coasts. Everything that would float was pressed into service to meet the emergency.

Unfortunately ships cannot be built in a day and ships built in haste are seldom those best suited for the purpose for which they are intended. The majority of the ships built just preceding and during the war were slow, costly to operate, and many of them inconvenient if not actually unfit for peace-time cargo-carrying. Having served their purpose during the national emergency they were unable to compete with the shipping of foreign nations striving with every nerve for commercial rehabilitation. The close of the war saw the United States carrying forty-three per cent of its own foreign commerce. Less than a decade later but thirty per cent is carried in American bottoms and at the present rate of decrease this will soon sink to the very low pre-war level.

Internal investments still offer too attractive opportunities for gain; there are too many foreign ships available for the transportation of American goods. Unless the people as a whole can be aroused to the situation, unless the importance of seapower as a factor in the life and prosperity of the nation can be driven home, unless it can be proved that power on the sea can and must be developed, the United States risks the danger of passing from history's pages. History shows that no nation has risen to world greatness without both commercial aptitude and seapower, or long continued in that greatness without developing that aptitude for trade and the seapower to complement it to their fullest extent.

The record of the United States on the sea since the middle of the nineteenth century parallels to a remarkable degree the marine history of France. Facing the sea on the east and west, with continental frontiers to the north and south, America is a great body of territory offering unusual advantages of climate, teeming with natural resources, and populated by an industrious, thrifty, and ambitious people. This geographical location and abundance of home wealth has led the nation into a neglect of its great instrument of seapower, indifference to which has placed such serious limitations upon the career of France.

Holland's decline as a seapower was due to the fear of continental invasion. Serious consideration of invasion on either of the land frontiers of the United States is unthinkable.

With the development of modern civilization the position of the United States as regards seapower approaches that of an island nation like England, and becomes less like that of a continental nation like France or Holland. America has no reasonable fear of invasion from either of her continental frontiers. Although her sea coasts are divided by a wide expanse of territory she is afforded an inside track for naval use in war and for commercial purposes in peace through the Panama Canal. With her plains crossed by numerous railroads and highways, the improvement in character and speed of land transportation is daily reducing the time of communication and consequently the relative distance between widely separated parts of the country. Tele-

phone and telegraph permit the almost instantaneous transference of human thought and wish from one coast to the other.

The World War developed the industries of the country to a point far beyond the needs of home consumption. Only the ability to command foreign shipping in sufficient quantity to relieve overproduction prevented serious business depression in the post-war years. The prosperity of any nation standing in the position of a world store house is dependent on the ability to transport its products freely, safely, and reliably to market and to bring back those goods and raw materials necessary to supplement its own products.

The merchants, farmers, and manufacturers of this country must have American ships to carry their products because American ships are the only possible insurance of reasonable freight rates on ocean transport, and reasonable freight rates will, in themselves, enable American producers to compete on an even basis in the markets of the world. American ships are, too, the only absolute insurance of an ample merchant transport for export and import trade at all times. Dependence on foreign shipping always risks the possible paralysis of American commerce through the withdrawal of ocean carriers to meet the national emergency of war or other calamity abroad.

No national project can long survive without national unity in thought and purpose concerning it. In any nation as large territorially as the United States, unity of opinion, desire, and purpose is difficult of attainment through a wide distribution of population and their natural diversification of interest. America has a stable and powerful federal government ready and willing to support and execute the will of the majority of the people if that will can only be crystallized, but the government cannot legislate unity from diversification unless the will for unity exists.

The only way in which unity of thought and purpose can be obtained in a large and widely distributed population is through careful and thorough education. Education is slow but it is sure if it is consistently and faithfully carried through. For centuries England has so fostered the seamindedness of its people that today Englishmen would rise as a body to down any suggestion, however slight, that might curb their power on the sea. They have ingrained in them the knowledge of their country's proud history of maritime achievement, and a sound confidence that the future greatness of the empire rests upon the sea.

The experiences of every nation involved in the World War afford an excellent example of the ability of a vigorous and consistent educational campaign to direct and support the will of a people. The development of a strong desire for the initiation of a national project in peace requires the most careful planning and consideration. Given a people with a generally high educational level, numerous channels for the dissemination of information are available. Newspapers, periodicals, the pulpit, lecture platform, and many other means, exert great influence on the minds of all with whom they come in touch. There is no locality in the United States that is not constantly reached by one or more of these mediums. There are no people of as high a general standard of education and intelligence as Americans. Consequently the distribution and reception of information in this country is comparatively a simple problem.

Plans should be laid for an educational program to cover a considerable period of years, for the education of 120,000,000 people, is slow. The marine history of the country must be thoroughly ingrained in the minds of all the people. Along with the history of American seapower, enough of its history as an economic factor in the rise and decline of nations must be included to bring about a thorough realization of the vital importance and necessity of a national shipping. When, through careful and thorough education, the need of a shipping to provide merchant transport adequate to the commercial advance of the nation has been realized, the demand for that shipping will follow naturally.

The unified will of a great people is hard to resist. It surmounts all difficulties, natural or economic. A representative government composed, as is the United States, of men above the average in intelligence, wisdom, and integrity, stands ready to further the expressed wish of the majority of its constituents for seapower through whatever legislation may be required to advance, favor, or protect American shipping.

An educational program capable of imbuing the people of the nation with a real-

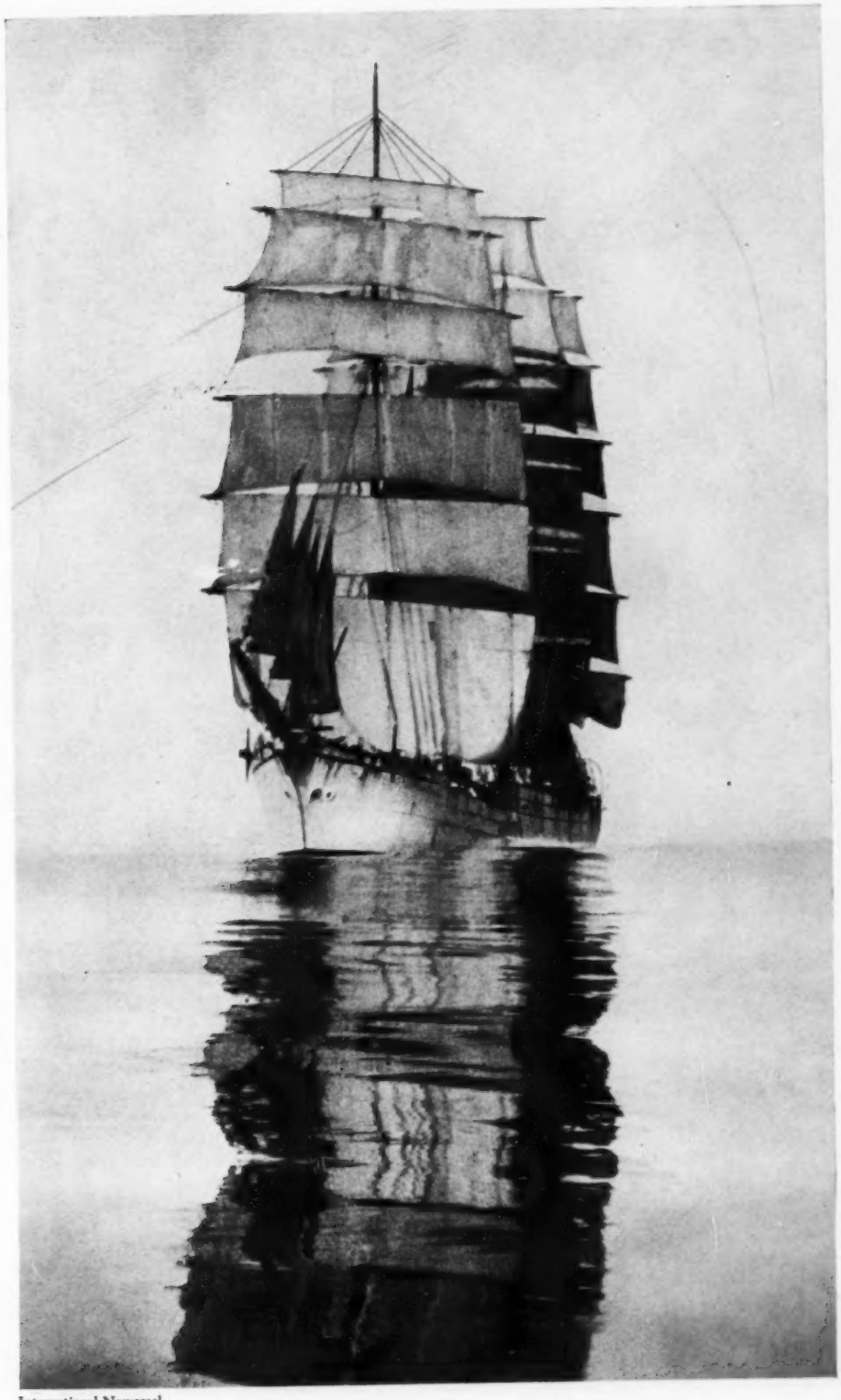
ization of the absolute necessity of providing an adequate ocean service to American commerce, and an ample national defense on the sea, should not be undertaken lightly. It cannot be planned or carried through by any individual. Its development must be the result of the thorough and consistent coöperation of the best minds available; its execution, the result of the vigorous and consistently united efforts of all. Its beginning may be small but it will surely spread and gain momentum until it is nation wide.

Once the desire for an American shipping is awakened, and the realization of the necessity of an ample power on the sea to sustain and develop the future greatness of the United States is driven home, the battle is more than half won. The factual accomplishment of seapower through a national shipping would be a natural result of the awakened demand.

"Whosoever commandeth the sea commands the trade, and whosoever commands the trade of the world commands the riches of the world, and consequently the world itself."[1]

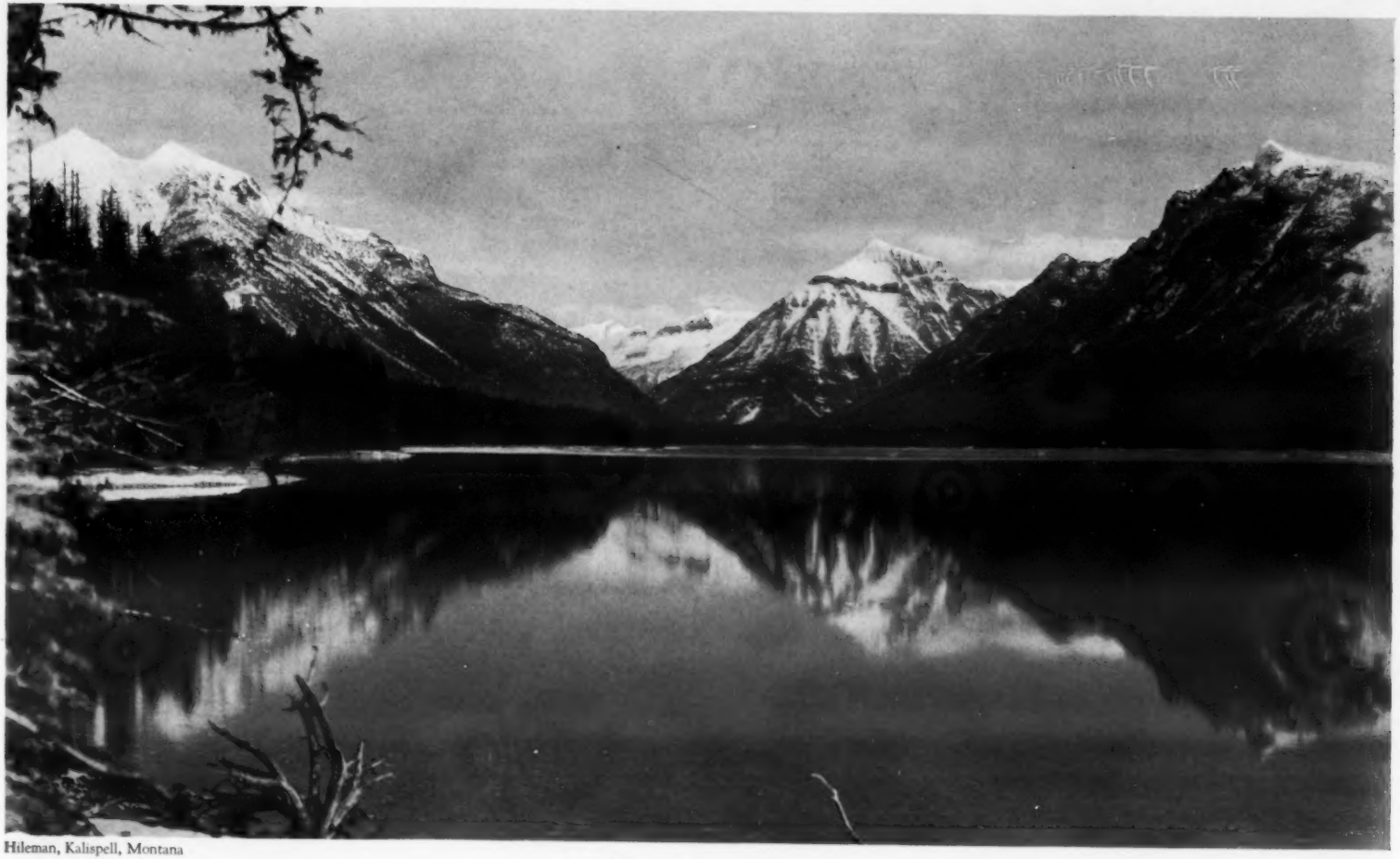
The United States must have power on the sea commensurate with the greatness of her commerce or be willing to take a secondary place in the family of nations. America can have power on the sea through education of her people to demand it. Legislation concerning a country-wide project is simply the codification of national desire. Let the people be educated, the rest will take care of itself.

[1] Sir Walter Raleigh.



International Newsreel

"A PAINTED SHIP UPON A PAINTED OCEAN"



Hileman, Kalispell, Montana

LAKE MCDCNALD, GLACIER PARK

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Hileman, Kalispell, Montana

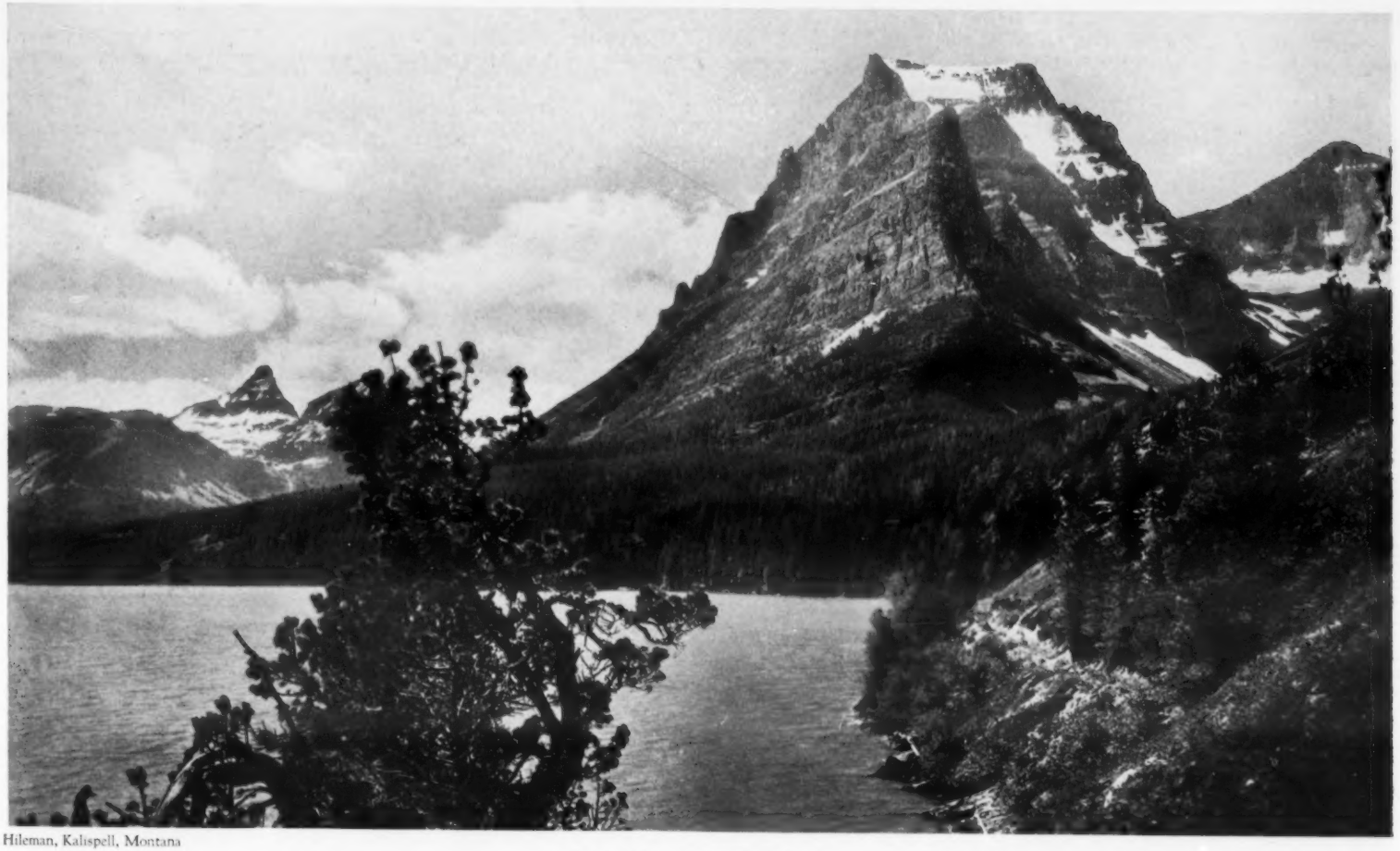
WATERTON LAKE, GLACIER PARK

Hileman, Kalispell, Montana

ANOTHER VIEW OF WATERTON LAKE, GLACIER PARK

Hileman, Kalispell, Montana

LAKE JOSEPHINE, GLACIER PARK



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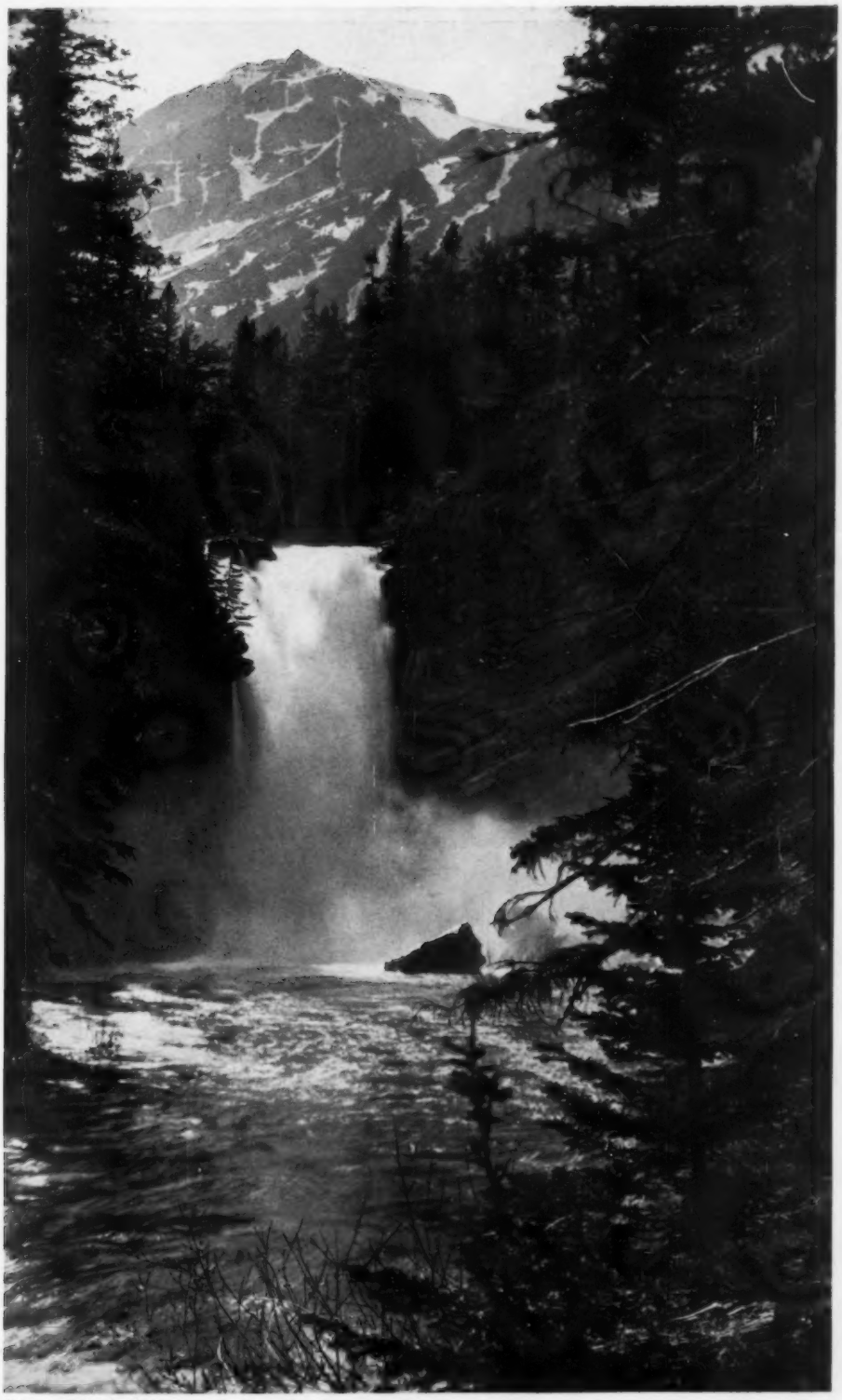
ST. MARY'S LAKE, GLACIER PARK



Hileman, Kalispell, Montana

TRICK FALLS, GLACIER PARK

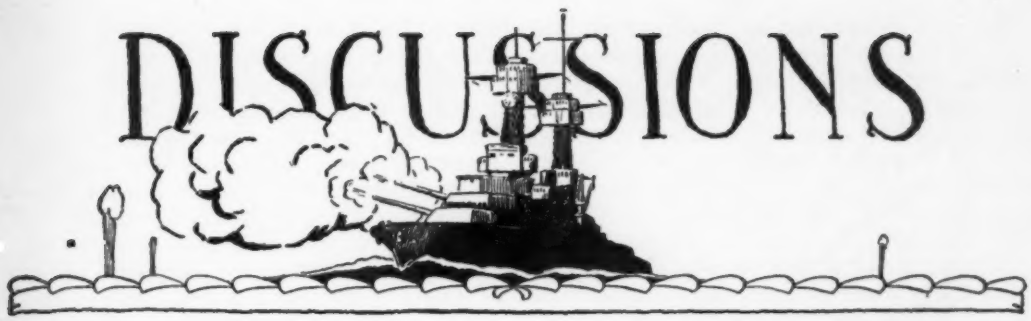
LV

International Newsreel

SECRETARY OF THE NAVY WILBUR DRIVES A NAIL FOR "OLD IRONSIDES," NAVY DAY, 1928

Rear Admiral Andrews, commandant of the Navy Yard, Boston, Massachusetts, sees that the work is well done.

DISCUSSIONS



A Great Forgotten Man

(See page 1, January, 1929, PROCEEDINGS)

CAPTAIN R. DRACE WHITE, *U. S. Navy.*—Commander Miles has worked up his study on Admiral de Grasse with a thoroughness that excites my admiration. It is nothing if not complete. Furthermore he has clothed the results of his research in a diction that is as engaging as it is scholarly. The recital is exact, yet entertaining. The reading of it has been a keen pleasure to me as it must be to anyone interested in the deeper side of our early history or appreciative of a smoothly running narrative.

All that is left me to add, and this may only possibly be of interest, is some information that has fallen into my hands about what might be styled the resurrection, or the re-discovery, of the memory of that truly great sea captain. Commander Miles leaves the admiral's heart safely buried in the church out at Tilly, about forty miles from Paris; the rest of his body, be it understood, being buried (also safely) in the church of St. Roch, Rue St. Honoré, Paris. Now, according to the word of one of the admiral's descendants who told me a good deal about the admiral, but who, I have no doubt, could learn a good deal from Commander Miles, the heart of the admiral has in fairly recent years been treated somewhat after the fashion with which we treated the remains of John Paul Jones, after we had got them safely removed from any danger of foreign entanglements. That is to say, it has been moved back and forth between the château and the church at least twice, maybe more times.

Some at least of these moves were made necessary by the very laudable desire on the part of the inhabitants of Tilly to provide a resting place for this reliquary worthy of the memory of this their greatest citizen. The movement started a long time ago and proceeded along normal lines. A crypt of generous beauty was constructed in the church and honor was considered satisfied. Then America, having remembered that such a man had something to do with our War of Independence, began sending out there to be placed on the admiral's tomb wreaths of flowers much larger than any that had ever before been seen in the Commune of Tilly. Naturally, the crypt that had been provided when the admiral's memory was only of local importance was far too insignificant when it became understood that his memory was held in deep veneration in that great sister republic beyond the seas. It was not quite understood why the memory of the admiral had so recently and astonishingly soared above par, but few things that happen in America are understood. Anyway, a more important crypt had to be built and the admiral's heart had to be moved over to the château.

The first of those wreath-laying pilgrimages, according to my information, took place shortly after we entered the war. There is not much available covering this gesture but I can readily understand the circumstances attending it. It was in those days of feverish inactivity; days when we were in the war but not of it; when we were considered good enough to pay for the war but not good enough to fight in it. It was particularly hard for those members of our naval establishment who found themselves held in leash in Paris. General Pershing (or was it Colonel ———? His name has escaped me) had uttered those dramatic and now historic words which announced to Lafayette, and to the world, that they were over there. The Army was on the map. But what about the Navy?

SECRETARY OF THE NAVY WILBUR DRIVES A NAIL FOR "OLD IRONSIDES," NAVY DAY, 1928
Rear Admiral Andrews, commandant of the Navy Yard, Boston, Massachusetts, sees that the work is well done.

Was its existence never to be recognized beyond the Yorktown barrier? Something had to be done. Then it was that somebody remembered about Admiral de Grasse, that great French sailor, who had won the War of Independence for us. A delegation forthwith hurried out to Tilly, posed a wreath, and told the admiral that the Navy also was in Paris.

The next pilgrimage of record seems to have taken place in 1922. In the *Parochial and Syndical Bulletin* of the Commune of Tilly, of December, 1923, mention is made of it in this way: The *curé* in the commune, who apparently is also editor of the *Bulletin*, and a sort of high factotum in management of ceremonials, says that he was told on October 24 of that year that a wreath was to be laid on the admiral's tomb three days later. He relates that in this he was somewhat surprised, for had not a wreath been laid on the admiral's tomb last year? This proves to me that the ceremony was enacted in 1922.

The *curé* also complains at the lack of warning given him. Only three days! One must *marche vite*. And speed up he must have, and come up to the scratch, for he relates that in those three days he made proper preparations, including the getting together as a reception committee the Municipal Council *au grand complet*, the *adjoints* of Tilly and Dammartin (the latter a nearby commune), the section of *combattants* of Longes (also nearby) and Dammartin, with their chiefs and their colors. Also there were the inevitable *enfants et pompiers*. The delegation placed "a magnificent wreath of chrysanthemums," (that is what took the pep out of that old design for the crypt) near the tomb, so the account relates; and a short prayer was offered by the *curé*, speeches by the counselor of our embassy and also by the chief of the French naval general staff. There was a speech by the head master of the school (the château was then and is now used as a semi-charitable school) who at the end of his speech, offered a bouquet of flowers to the American naval attaché, who is signed up in the gold book, M. Eterlé. There was also a *"vin d' honneur"* at the château. The recorder ends by saying that he understands that the delegation were enchanted with their reception and that they promised to return. Also that all the world was content. But oh! if they had only known sooner! Only three days' notice!

The annual pilgrimage on Navy Day seems to have faded out since then. At least I find no record of any having taken place. But this year there was enacted a ceremony long to be remembered at Tilly. The new crypt, the worthy one, had been finished, a wreath therefore must be laid. And there could be no complaint of lack of warning this time, for the preparations for the ceremony began a year before, and were initiated and carried out by the municipality of Tilly itself. The rustler for the movement, I can think of no better name, was the *curé* of the village, l'Abbé Blain. A finer, more earnest and efficient worker I have never known, either in his cloth or any other. He might be Napoleon or Mussolini, or Charles M. Schwab. He was indefatigable in rounding up the necessary material and personnel for the ceremony, and was blessed with tact, discretion, and discrimination so necessary to the successful running off of so important an event in a small French village. To him must be accorded the credit for the successful unfolding of an historical incident, touching and simple and dignified at once.

It was a beautiful April day—a day such as one seldom sees outside of France. The sun shone bright in a crisp inviting-you-out-of-doors air. The fields were green, sometimes flowered, and all Tilly was *en fête*. The constitution of the pilgrimage was worthy of the occasion. Our ambassador headed the delegation. The French War Department sent General Gouraud, the worshipped of all the worshipped of the French Army, now governor of Paris. The French Navy Department sent Admiral Jehenne, president of their war college. There was the bishop of the diocese, the mayor of the commune, the *pompiers et enfants* as usual, and l'Abbé Blain.

The ceremony was brief. Four stalwart sailors emerged from the château carrying the venerated reliquary in a casket draped with the flags of the two republics. They were preceded by the clergy and followed by the high personages above listed. All Tilly followed. Straight to the church. A short prayer by the bishop. A remarkably fine choral, a few words of benediction, and then outside to a sort of marquee, for speeches.

Our ambassador made a fine speech, taken almost entirely from an article by Commander Miles entitled, "The Yorktown Campaign." General Gouraud said a few vague words about the friendliness that existed between the two republics, which was vigorously applauded. Admiral Jehenne said nothing, as a sailor should. And the ceremony was finished. Finished as far as the ambassador was concerned. There was of course the regulation *vin d'honneur,* but he side-stepped that. (Only the great can refuse proffered hospitality and remain friends.)

The pilgrimage rolled back to Paris—following part of the way the road over which Louis XVI (who refused a hearing to Admiral de Grasse in his time of trouble) and his queen were dragged by the mob as prisoners on their last trip to Paris; they who later were dragged by the same mob to the scaffold.

The press the following day was generous. Papers that habitually give space to illustrations showed effective photographs. The speeches were reported in full, and editorials rejoiced at the generous credit given to the admiral in our ambassador's speech. Satisfaction was expressed at this re-sealing of friendship between the two great nations—between whom there really never can be anything but friendship. The dignitaries were generally listed—all save the l'Abbé Blain. But I believe he minded it not, for his heart was full. For one brief moment two idols of his heart, the Commune of Tilly and the memory of François-Joseph-Paul, Comte de Grasse de Rouville, Marquis de Tilly, etc., etc., had lived vividly before the world again.

Some Autobiographical Notes Concerning the Services of the Late O. W. Farenholt, Rear Admiral, U.S.N. (Retired)

(See page 1047, December, 1928, PROCEEDINGS)

ADMIRAL E. H. C. LEUTZE, U.S.N. (*Retired*).—I have always understood that Evans was wounded in the assault on Fort Fisher and think this is correct, but that of course can be easily verified in Evans' book, *A Sailor's Log.* He could hardly have left the Academy when the assault on Fort Sumter took place.

The statement that Admiral Farenholt was first commandant of Cavite can be amplified with benefit.

In August, 1898, when in command of the U. S. S. *Monterey,* I was ordered verbally by Admiral Dewey to take command of Cavite as additional duty to command of the *Monterey.* It was immediately after the surrender of Manila. (By the way, I am the only one of the commanding officers who took part in that affair still living.) I was afterward ordered by Admiral Watson, who succeeded Admiral Dewey, to take charge of the defense of the peninsula of San Roque, on which Cavite is situated, whenever the admiral was absent.

Commanders Asa Walker and E. P. Ward had joint command of the yard for a few weeks before I was ordered.

I performed all the duties of the commandant of the navy yard. Started work with fourteen ship mechanics, and when I left, January 1, 1900, had about 300 Chinese, mostly mechanics, working there, and 1,000 Filipinos, some mechanics, but mostly laborers, unloading colliers and coaling the vessels. I was relieved from command of the *Monterey* by a captain, from command of the navy yard by a commander, and as head of the departments of ordnance, construction and repair, and yards and docks by a lieutenant commander, a naval constructor and a civil engineer, i.e., five officers in all.

When I left, all the departments were in working order with a general storekeeper and pay officer. An engineer officer had reported for duty soon after I assumed command. The yard did all repairs for the fleet and so much cheaper than Mare Island, that politicians interfered and some foremen were sent from California; but they soon quit, not liking to start work at 6 A.M. and leave off at 5 P.M. with two hours off in the middle of the day.

I was acknowledged commandant by the Navy Department and also by the Treasury in their own way. The latter at one time checked my pay for $40,000 for illegal expenditure of funds, the spending of which I had approved and signed vouchers for. Admiral Watson, then commander in chief, sent for me one day and sympathetically told me he had bad news for me. "Nothing about your family you understand." Then he broke it to me that I had been checked $40,000 for illegal expenditures. I told him

I was glad it was not $40. Eventually the President covered the illegality by an allotment from his special fund.

Later on in 1904, while in the Mediterranean in command of the *Maine*, I was notified by the Treasury Department that I would be checked the difference between sea pay and shore-duty pay for the time I was in command at Cavite, as the Navy Department had informed them that my duty as commandant was paramount over my duty as captain of the *Monterey*, but before doing so would like to hear from me. The amount was about $300. Fortunately Admiral Barker, who had succeeded Admiral Dewey in Manila, was in command of the squadron to which my ship, the *Maine*, belonged, and Admiral Dewey was in Washington; so the checkage was stopped by them.

Shortly before the taking of Manila we had a council of war with Admiral Dewey on board the *Olympia*. The Swiss consul represented the Spanish garrison. He delivered an ultimatum that if we approached within 3,000 yards of the Krupp battery to the eastward of the mouth of the Passig, the battery would open fire. Dewey asked me how close I could go to the battery and I told him about 400 yards, and he said, "Well, you go there, but do not fire unless the battery fires first. That is the answer."

Meanwhile, Captain Coghlan of the *Raleigh* picked up the consul's notebook and found a note therein telling him to look out for the *Monterey* for anybody who would cross the Pacific in a thing like that was crazy enough to do anything.

Shortly after the Swiss consul landed (Dewey having attended the council of war), the archbishop came off to the *Olympia*, invited Dewey's attention to the fact that his house and the cathedral were in the line of fire beyond the Krupp battery and begged him not to fire on the battery. Dewey told him if the Krupp battery fired it would be fired upon and that there would be some high shots without doubt. Consequently the Krupp battery did not fire; neither did the *Monterey*, much to the disgust of the crew who had indeed crossed the Pacific in a "tinpot" as they expressed it, and wanted action.

During the early part of the Navy's occupancy of the Cavite yard the commanding general of the Army was permitted to occupy the Commandancia on condition it would be left intact. One morning about six o'clock I landed from the *Monterey*, and found a junior officer of the Army loading the old mahogany furniture from the Commandancia into a casco. I told him to desist, but he said I was no one to give him any orders and the troops on duty in the yard were under his orders. Whereupon I told my coxswain to go off to the *Monterey* and tell the first lieutenant to arm four boats and clear away the secondary battery, and if the casco shoved off to take her. "Oh, I didn't know you were going to do that. I'll have to let the general know," said the young officer. That afternoon I stood out in front of the Commandancia where I could not be missed and observed the general bearing down upon me. He never arrived however because he sighted Admiral Dewey, who had just come ashore (having approved of my actions in the forenoon and knowing the general was coming) approaching from the opposite direction. He turned and beat a hasty retreat, and the furniture stayed in Cavite.

Diesels for Naval Auxiliary Ships

(See page 461, June, 1928, and page 783, September, 1928, issues.)

LIEUTENANT CARL J. LAMB, *U.S.N.R.*—Mr. Livingston, in his discussion of Lieutenant Dierdorff's admirable and well-prepared paper, advocates conversion of certain steam-propelled naval auxiliary vessels to Diesel power, basing his reasoning, to some extent, upon the $25,000,000 program of the United States Shipping Board.

We are afraid that both Lieutenant Dierdorff and Mr. Livingston have lost sight of one very important fact. That is, high thermal efficiency does not necessarily mean best fuel economy, when converted to dollars and cents of operating cost. So far, the Shipping Board vessels which have been converted to Diesel propulsion have cost over $700,000 each to be so converted. A figure of fifteen per cent is generally used commercially to represent fixed charges on the investment, as interest, insurance, and depreciation, which of course, represents part of the total operating cost. The Shipping Board maintains a semi-annual competition, similar to the Navy's yearly engineering competition, and periodically lists on its

"Roll of Honor," the fifty ships of its total fleet which have the highest scores. Although thirteen converted Diesel vessels are now running, only two appeared on the last "Roll of Honor," the other forty-eight being war or pre-war built steamers, some propeled by geared turbines, some by reciprocating engines.

The writer recently obtained from a prominent oil company a quotation on Navy "Bunker C" boiler oil and standard Shipping Board specification Diesel oil in 1,500-barrel lots, delivered aboard ship, in New York harbor, as follows: Navy "Bunker C," $1.10 per bbl.; Shipping Board Diesel, $2.065 per bbl.

It is doubtful if any Diesel-propelled vessels are using less than .55 lbs. of fuel oil per S.H.P.-hour for all purposes. While the older steam vessels use in the neighborhood of 1 lb. of fuel oil per S.H.P.-hour for all purposes, it should be noted that several modern geared-turbine driven steamships approach quite close to the Diesel performance rate. The American steamships *Malolo, Dixie,* and *Waialeale* are reported to average between .75 lbs. and .9 lbs. oil per S.H.P.-hour for all purposes, while the new British passenger steamer *Duchess of Bedford* recently made a passage of the Atlantic with a figure given by the operators of .62 lbs. of oil per S.H.P.-hour for all purposes.

In general for powers above 1000 S.H.P., the Diesel-engine installation weighs more and takes up more space in the hull than does the geared-turbine installation for the same propeller speed and at the same horsepower rating. In time of war, or sudden emergency, any oil-burning steamship may be converted to a coal burner at small cost in a very short time. Finally, it should be remembered that many naval auxiliary vessels are often called upon to furnish steam or fresh water to other naval ships, and certain ones are required to have large distilling plants.

All things considered we believe that the United States Navy has been wise to retain steam propelling machinery. It cannot afford to take chances. Although it is not run on a commercial basis, the Navy is vitally interested, not in the cost of a gallon of oil, but in the cost of a delivered horsepower and the availability of fuel to generate such a horsepower under any and all conditions.

Selection of Enlisted Men for the Naval Academy

(See page 457, June, 1928, PROCEEDINGS)

BROCKHOLST LIVINGSTON.—Lieutenant Decker's article is seemingly a plea for properly utilizing the power which has been placed in the hands of the officers of the Navy by Congress when it authorized the appointment of one hundred midshipmen from the enlisted personnel of the Navy and Marine Corps. Perhaps the author is a trifle too enthusiastic over the results. His figures may back up his conclusions but we are forced to question his statement that "a candidate from the enlisted personnel is . . . better fitted physically and mentally . . . and upon entering the Academy is much less liable to fail." Undoubtedly the candidate is better fitted physically but I must seriously question whether he is better equipped mentally than the boy who has been in constant contact with his studies. I have always been a believer in the appointments from the enlisted men but there are drawbacks which must not be forgotten.

Admiral Belknap in discussing this article questions many of the author's conclusions. The admiral is especially capable of doing so from long experience with the service. An outlet for enlisted men possessing the characteristics of officers must be supplied, we all admit. The present law is sufficient. Until the enlisted personnel is greatly increased—which is a move of the distant future—no increase would seem advisable in the number of appointments to Annapolis from that source.

The technical knowledge gained by a year with the fleet is surely beneficial to a candidate for the Academy. The other knowledge gained may be of no good to him. The year as an enlisted man may, of course, bring forth characteristics which will prove the boy incapable of properly acquiring the principles of an officer. In this, the "probationary period" would be useful.

Many have advised that the Naval Academy course be lengthened to five or six years. To cover the requirements which Lieutenant Decker states are found in the enlisted candidate, would not a year of actual probationary training be advisable? Let the age limits be sixteen and nineteen in place of the present sixteen and twenty and a preliminary year be given in which

the midshipmen—acting midshipmen, they could be styled—would serve for three months at a training station and nine months at sea on board a training ship. Both at station and on board ship the boys could be closely observed and the poor material removed. It would be necessary, of course, to increase the congressional appointments for "acting midshipmen" in order that at the end of the year sufficient good material would be available to take care of the present authorized number of midshipmen.

During the preliminary year, boys would receive the pay of a seaman, second class, and would be required to pursue regular studies such as are given at a preparatory school. Thus, I believe, the seagoing knowledge gained by the enlisted man would be supplied and yet boys would be kept from the bad influences of "hard-boiled" seamen.

The course at Annapolis need not be radically changed, as the additional year would be only a test period in which the better material could be found.

There is so much discussion of a change in the Academy make-up that there must be some cause for it. Outsiders are incapable of discerning wherein there is weakness but that there is such weakness is unquestionable. By weakness we need not mean failure to produce the proper results but the *best possible* results.

Latitude and Longitude from a Simultaneous Observation of Altitude, Azimuth, and Time

(See page 993, November, 1928, PROCEEDINGS)

COMMANDER RADLER DE AQUINO, *Brazilian Navy.*—With the late improvements in the gyro compass and the possibility of obtaining true azimuths of celestial bodies, within reasonable limits, attention is being given to those methods in which altitude and azimuth are associated.

I do not agree with the author that it is possible to obtain a true azimuth *at sea* "within one or two minutes accuracy," but will readily accept ten minutes of arc as the extreme limit of inaccuracy with the new gyro-compasses in use, provided the altitude is not over 30°.

This means, from an examination of Mr. Vincent's paper, that finally what we should obtain from Mr. Willis' or Mr. Vincent's methods would *really* be a segment of the Sumner line of position twenty miles long, which the ordinary everyday methods give us already without the necessity of an *extra* observation of azimuth.

What the writer has been trying to impress upon the nautical world for the last twenty-five years has been the double advantage of taking an azimuth at the same time as the observation of altitude, not only for compass control, but *also* to shorten the labor of determining a line of position at sea and, since 1918, also in the air.

When the altitude and the azimuth of a celestial body are observed simultaneously, the D.R. position does not have to be calculated up to the time of the observation, as the writer's "Tables" give immediately, with h and z, the page on which all the data for determining a line of position is found.

Instead of employing complicated formulas for finding L, as Mr. Willis and Mr. Vincent do, it is easier and more accurate *in all cases* to use the basic formulas of my tables.

Mr. Vincent's example on page 994 would be worked out as follows:

log cot d—0.46545	log cot h—0.33742
log cos t—9.83942	log cos Z—9.81839
log cot b—0.30487	log tan C—0.15581
b—26 21′ .7	C—55 03′ .9
	b—26 21 .7
	L—28 42′.2N

No rules or naming of data are necessary. The combination of b and C gives us L.

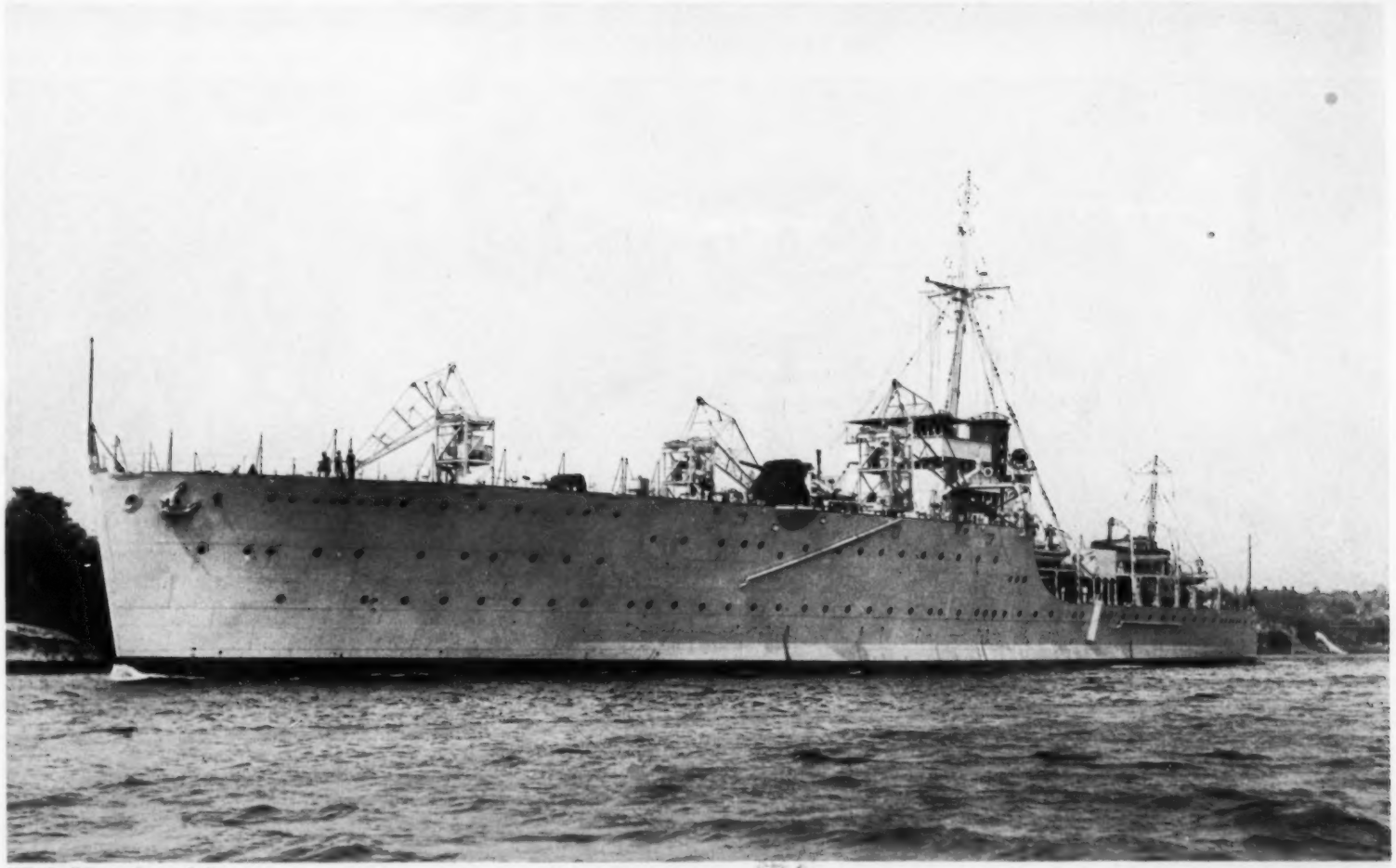
This, however, is going back nearly a century to the days before Captain Sumner showed the value of a straight line of position.

It should be impressed upon every navigator that *all* the necessary information can be obtained from the Sumner line of position itself and the simplest, the readiest, the safest, and the most exact way to determine it is by means of inspection tables from an *assumed* position.

Those who love to make a *detour* through logarithms will find pleasure and profit in using Mr. Willis' and Mr. Vincent's methods, although their application at sea is limited.

Attention is called to a recent article by the writer in the *Revista Maritima Brasileira* for July, 1928, entitled "Curvas e rectas do Azimuth na Navegação: Astronomica e Radiogoniometrica."

Rio de Janeiro, November 18, 1928.



"The Sun" Feature Bureau, Sydney

SEAPLANE CARRIER *ALBATROSS*

MADE IN AUSTRALIA—Seaplane Carrier *Albatross*, built at Cockatoo Dockyard, Sydney, of Australian steel by Australian workmen. She has just performed excellently on her trials.

Courtesy Roger Williams. Photo by Edwin Levick, New York

S.S. *VIRGINIA* OF THE PANAMA-PACIFIC LINE

Latest addition to the United States merchant fleet. Electrically propelled and modern in every respect. Built by the Newport News Shipbuilding and Dry Dock Company for fast service between New York and San Francisco.

PROFESSIONAL NOTES

4 December to 3 January

Compiled by

Commander F. W. Rockwell, U. S. Navy

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and

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GREAT BRITAIN

Naval Airships

Naval and Military Record, November 21.—The United States naval authorities apparently were so much impressed with the performances of the *Graf Zeppelin* that they promptly placed orders for two airships for use with the fleet. These will be the largest dirigibles ever yet built, considerably exceeding in gas capacity the two now under construction in this country. In the British Navy the feats of the German airship have produced no changes of view whatever. The advantages of the type over the aeroplane have always been recognized, but so have the serious disabilities with which those advantages are beset. It has gradually leaked out that the *Graf Zeppelin* had some pretty narrow escapes, and indeed, Dr. Eckener has frankly admitted that "luck favored him." A military aircraft cannot afford to stake too much upon luck. The German airship went very wide of her course to "humor" the weather, and did not meet with anything more than normal Atlantic conditions. Yet at one time, with her engines running all-out, she was making stern-way.

No doubt America is much more favorably situated for the military employment of airships than any other naval power. Her coastlines are very remote from any possible enemy; therefore, the chance of an airship being riddled from the sea is comparatively small. Her strategical position necessitates long distance reconnaissance. Whether an aircraft carrier could not perform this duty more effectively and with infinitely greater reliability is a question which we must presume the Washington people have considered. The Pacific is a fair-weather ocean, although rather liberally supplied with thunderstorms, which are not nice for airships. Apropos of aircraft carriers, some of the outspoken critics in the United States are expressing great dissatisfaction with the *Saratoga.* They say that it has been found impossible to get more than twenty-two knots out of her, or about ten knots less than her originally designed speed. Be this as it may, it is a perfectly practicable proposition to build an aircraft carrier of any required speed within mechanical limitations, but, as yet at any rate, the same cannot be said of the airship.

JAPAN

Emperor Reviews Fleet

Baltimore *Sun,* December 4.—The greatest display of seapower ever gathered together in Far Eastern waters passed for inspection today before the newly enthroned Emperor Hirohito in the grand enthronement naval review.

Approximately 180 fighting ships of all classes took part, ranging from the great superdreadnaughts *Mutsu* and *Nagato* down to destroyers and gunboats.

The Emperor arrived here this morning and boarded the battle cruiser *Haruna.* He had selected this for his flagship because it has just undergone a complete overhauling and refitting to bring it into line with the latest principles of battle cruiser construction.

The review was an international naval spectacle, for the four other signatories of the Washington naval limitation treaty had envoys present. The United States was represented by Admiral Mark L. Bristol, commander-in-chief of the Asiatic fleet, and the ranking visiting officer, who came on his flagship, the cruiser *Pittsburgh.*

Vice-Admiral Sir Reginald Yorke Tyrwhitt, commander of the British Asiatic fleet, brought three of England's newest and finest, 10,000-ton cruisers—the *Kent,* the *Suffolk,* and the *Berwick.* Rear-Admiral Stoltz, commanding the French fleet in the Far East, was there on his flagship, the cruiser *Jules Michelet.* Italy sent the small cruiser *Libia* with her ranking officer in the Orient, Captain Pini. Holland was represented by the cruiser *Java.*

The *Haruna* is one of four sister ships with a tonnage of 27,500 and a speed of twenty-seven knots. Two of her sisters, the *Kongo* and the *Hiyei,* took part in the review. As the flagship steamed along each of the six lines in which the navy was arrayed she was preceded by the *Kongo* and followed by the *Hiyei.* The *Kirishima,* fourth of this class, was in drydock for reconditioning.

Five battleships brought the total of participating capital ships to eight. These included the *Nagato* and *Mutsu,* of 33,800 tons and carrying 16-inch guns; the *Yamishiro* and *Fuso,* 30,600 tons, and the *Hyuga,* 31,250 tons. The *Ise,* sister ship of the *Hyuga,* is being reconditioned.

The *Mutsu* had been the subject of prolonged discussion during the Washington Conference, where the Japanese contended, successfully, that she had been completed before the conference opened and therefore should not be scrapped.

Twenty chosen modern light cruisers, ranging from 10,000 tons down to 3,000, took part. Among these was the 10,000-ton *Nachi*, the first to be completed of six which Japan is building to match Britain's *Kent* class and the new cruisers authorized for the American Navy. All twenty are post-war vessels and all were built in Japan.

Eighty-one destroyers, thirty-four submarines, and more than forty other vessels were in the review. The flying arm of the navy was represented by about 135 planes.

Admiral Hyo Takarabe, Minister of Marine from 1924 to 1927, commanded the combined fleets.

Since the last enthronement review in December, 1915, for the Emperor Taisho, Japan has advanced from an uncertain fourth or fifth to an undisputed third place among the naval powers of the world, ranking behind only Great Britain and the United States. Japan has made substantial progress in naval design and construction and her dockyards rank among the best in the world.

Among the new ships partaking in their first enthronement review were the 27,000-ton airplane carriers, *Kaga* and *Akagi*, made over from the half-completed frames of battleships intended for the program halted by the Washington Conference. Of the twenty-one capital ships paraded in the annual naval review in 1919, all but eight have been scrapped or reduced to non-combatant status in accordance with the Washington Treaty.

GERMANY

German Sea Power

Naval and Military Record, November 28.—The German cruiser *Berlin* has been making an extended voyage in the Pacific, and after calling at Colombo, Karachi, and Aden, is now on her way home. She is one of the pre-war vessels, so that there can be no question of showing her to the world as one of the latest products of the German naval yards, as in the case of the new *Emden*, which made a prolonged cruise throughout the Far East. We have seen it suggested that now Germany has no colonial possessions there can be no legitimate reason for her sending warships to the ends of the earth. This is perfectly ridiculous. As well argue that because the United States has no possessions in Europe there is no reason for her to maintain any naval force in European waters. Germany has a great seaborne commerce, and this alone constitutes a valid reason for showing her naval flag in those regions with which she trades.

The future of German sea power is very obscure. In the course of the next few years the prohibitions imposed by the Treaty of Versailles will expire, and she will be free to resume naval construction as she pleases. That she will set strenuously to work to restore her sea strength and prestige seems fairly obvious. But if meanwhile international agreement upon limitation of armaments should be reached she will doubtless conform since she is now a very sedate member of the League of Nations and professedly devoted to the cause of peace. Yet there are thorns in her side which must prick her with the desire to be strong at sea. The Danzig Corridor is one of these, and Russia may easily prove another. But more prickly still is the recollection of her lost places in the sun. Possibly we may witness a political revision of the penalties under which she lost her colonies. In all the discussions about sea power Germany does not figure at all, presumably because at the moment she is a negligible quantity. But this omission rather savors of a lack of prevision. Probably it suits the German view very well to be entirely left out of all calculations since this will leave her at liberty to do as she pleases when the time comes.

The New 10,000-ton "Baby Battleship"

Baltimore *Sun*, December 28, by H. C. Bywater.—Exclusive but official details of the *Ersatz Preussen*, first of Germany's new "baby battleships," which have just reached me from Berlin, show her to be the most remarkable warship in the world.

Although displacing only 10,000 tons, she has the fighting power of a battleship, the speed of a cruiser and the radius of the biggest ocean liner.

Among the features that render her absolutely unique are the following:

A hull electrically welded throughout, in-

stead of being riveted, built up of special steel evolved by a secret Krupp process.

Diesel motors of extraordinary power and efficiency, developed after years of experiment by the German admiralty.

Fuel capacity for a non-stop voyage of 10,000 miles at a continuous speed of twenty knots.

Armament that would enable her to engage and sink three ordinary cruisers of her own tonnnage.

The ship is being built virtually regardless of expenses in an effort to produce the utmost battle power within the 10,000-ton displacement limit, specified by the Treaty of Versailles. She will cost $20,000,000, or as much as a dreadnaught or battleship nearly three times her size.

Her Diesel motors of 50,000 horsepower have been designed secretly and represent an amazing technical advance over all existing types. They are of feather weight construction, developing one unit of horsepower for every seventeen pounds of weight, whereas in the Diesel engines built a few years ago the customary ratio was ninety pounds weight to each horsepower unit.

The ship will have a maximum speed of twenty-six knots and thus will be able to show a clean pair of heels to any capital ship, except battle cruisers. Owing to her immense fuel supply she will be practically independent of shore bases, and in view of her powerful armament she could defy any antagonist below the dreadnaught rank. Employed as a commerce raider, she would thus be capable of causing incalculable damage, and the appearance of such a ship on the trade routes would introduce an entirely new factor into war strategy.

The *Ersatz Preussen* is armor plated end to end and has, besides, heavy steel decks over her vital parts. The hull is so split up into water-tight compartments that it is claimed to be unsinkable by torpedoes or mines, the danger from which is further minimized by her shallow draught.

Mounted in two triple armored turrets are six 11-inch rifles with high angle of elevation and rapid loading gear. Each of these guns can fire shells of 670 pounds weight at the rate of three per minute and range up to 30,000 yards. As auxiliary armament there are eight 6-inch guns. Several anti-aircraft pieces and six deck torpedo tubes are also carried.

The ship has a lofty freeboard and the entire armament is mounted so high above the waterline that it could be fought with full effect in almost any weather. Proportionate to her size the *Ersatz Preussen* is unquestionably the most powerful warship ever designed. It is believed she will be named the *Admiral Scheer* when launched. Three sister ships are to be built in the next few years.

The first appropriation for the initial ship nearly brought about the downfall of the German Cabinet. The fact that the money was voted in the face of fierce parliamentary opposition is regarded here as a tribute to the continued influence of the navalist party in Germany.

FRANCE

721,000-ton Fleet Planned

New York *Times,* December 28.—By 1943 at the latest France will have a fleet which will, if plans now prepared are worked out, be of the following tonnage: Capital ships and armored cruisers, 175,000; light cruisers, destroyers and torpedo boats, 390,000; submarines, 96,000; airplane carriers, 60,000.

These figures have been submitted to parliament as a program which may be reasonably aimed at and will at the same time meet France's limitation engagements and her defense needs. The capital ships will have twenty years' life, light cruisers seventeen years, destroyers fifteen years and submarines twelve.

This program, however, is entirely theoretical. The present cost of a battleship is between 300,000,000 and 400,000,000 francs [roughly, $12,000,000 to $16,000,000], and in his report on the proposed program Deputy Pierre Appell writes:

> While it appears right to maintain the figure of 175,000 tons for capital ships in the program, it is under the reserve of their abandonment if other powers also renounce their use. In the same way airplane carriers will not be built unless present experience with the *Bearn,* which is a 22,000-ton ship, justifies further expenditure.

France holds most firmly to light ships, and the report declares that the construction of 360,000 tons of these is indispensable for use in the Atlantic and Mediterranean and for colonial work.

Submarines of 96,000 tons—about forty in number—are also considered a minimum.

Half of these only would be in commission at the same time, ten in the Mediterranean and ten in the Atlantic and the Channel.

The cost of the proposed program is given at 981,000,000 francs a year, and 794,000,000 is for battleships built. Next year France will spend for upkeep and construction of the navy 2,960,000,000 francs.

UNITED STATES

New Army Anti-Aircraft Guns

New York *Times,* December 8.—Marked advance has been made by the ordnance branch of the army in the development of anti-aircraft guns, including a 3-inch gun and mobile mount, and a new 105-millimeter gun and carriage, designed for joint use in defense operations and one supplementing the other.

Both the army and navy have developed improved mounts for anti-aircraft machine guns. The chief advance by the army in this field, it was said today, is in the new 3-inch and 105-millimeter guns.

For the mobile mount of the 3-inch gun, stability, mobility, and maneuverability to a degree far beyond that achieved in previous designs are claimed. The carriage is stable under all conditions of firing, it may be emplaced from the traveling position in readiness to fire in about fifteen minutes, and it is so light in weight that it can be towed across country by a standard four-wheel drive truck.

The gun is fifty calibers in length and is made of an outer tube and an inner removable liner. The removable liner represents a marked advance in gun construction, as it does away with the necessity for sending a worn-out gun to an arsenal for retubing. The cost of the liner is a small fraction of the cost of a new gun, and it can be installed at the firing front in a few minutes by battery personnel using simple hand tools. The use of loose liners in anti-aircraft guns is said to be of the greatest importance, since it reduces the problem of gun erosion and permits the use of higher muzzle velocities.

The gun fires a standard 3-inch projectile at a muzzle velocity of 2,600 feet per second. The vertical range is about 5,000 yards and the maximum horizontal range 11,000 yards. The gun is equipped with a semi-automatic breech mechanism which closes when the round is pushed home, and opens automatically and ejects the case when the gun is fired.

A continuous fuze setter is provided with the carriage. The time fuze remains set at the proper range of the target as long as it is in the instrument. This type of fuze setter decreases the time interval between the computation of data and the firing of the gun, and has materially increased the efficiency of anti-aircraft fire. The gun can be fired at a rate of about twenty-five shots a minute.

The indirect method of fire control is used. The firing data is transmitted continuously by electrical means from a central station computer to the gun.

The new 105-millimeter gun is declared by army officials to be the most powerful anti-aireraft gun yet tested. Arrangements are well along toward its standard issue to the service. It is sixty calibers in length, the longest gun in caliber length ever built in the United States, and designed for a muzzle velocity of 3,000 feet per second. It will fire a thirty-three pound projectile to a height of 12,000 yards with a maximum horizontal range of 20,000 yards.

The increased weight of the shell, as compared with the 3-inch gun projectile, increases the danger space or effective area of the burst. The high muzzle velocity and greater weight of projectile considerably reduce the time of flight at all ranges.

An automatic rammer system is provided to load the complete round of ammunition, which weighs about sixty-five pounds and is too heavy to load by hand. The rammer mechanism is so constructed that it is thrown to the rear during the recoil of the gun, compressing the air in the rammer cylinder.

To load the gun it is only necessary to place the complete round on the loading tray and pull the rammer lever. The gun is equipped with semi-automatic breech mechanism, which closes as soon as the round of ammunition is pushed home, at the same time locking the rammer head out of position. Upon firing, the breech block opens automatically and ejects the empty shell case.

A continuous fuze setter is provided with the carriage similar to that employed with the 3-inch gun and the rate of fire is about fifteen shots per minute. This gun also is laid on the target by the indirect method.

MERCHANT MARINE

Annual Report of U. S. Shipping Board

Washington *Post,* December 3.—The twelfth annual report of the United States Shipping Board, for the fiscal year ended June 30, last, is made public this morning. One thing, it says, is certain—the American shipping industry can not stand still. If it does not keep abreast of the times it will be forced into a subordinate position by the activities of its foreign competitors. The number of ships being built at the present time in foreign yards, says the report, indicates that in the matter of new construction the United States is rapidly being outdistanced by some of the other maritime nations, the latest figures showing that for every ocean-going ship the United States builds, Great Britain is building fifty; Germany ten, France and Italy each five, and Japan four.

The Shipping Board report recalls the conference of private American steamship owners, operators and builders, called in January, 1928, in order to ascertain their views and on the basis thereof formulate a series of recommendations to Congress. Resolutions adopted by the conference pointed out that "the overseas merchant fleet is being rendered obsolete by the rapid march of science and invention, which has completely revolutionized the manner of vessel propulsion since the American ships were built." The resolutions called upon Congress for prompt constructive action looking toward reconditioning some of the present fleet and providing inducements having in view its early transfer to private ownership under conditions assuring continuance of operation. As a result of the conference Congress passed the merchant-marine act of 1928, popularly known as the Jones-White Bill, which the report characterizes as "the outstanding event of the year so far as the American Merchant Marine was concerned and one of the most important legislative measures ever passed by Congress in the interest of American shipping."

It remains to be seen, says the report, how effective the act will be in stimulating activity in American shipyards. Since the report was written, however, there have been indications that it will fulfill admirably the purposes for which it was intended.

The Shipping Board suggests that enactment of the code of navigation laws codified by its legal department should no longer be delayed; that changes should be made in existing law relating to the division of damages in cases of collision at sea; that a load line bill should be enacted prior to the international conference on safety of life at sea, that provision should be made for tax exemption on American vessels operating in foreign trade; that legislation should be enacted looking to the transfer to privately owned American shipping interests of the peacetime business now handled by Army and Navy transports; that funds should be provided to carry into effect the act providing for the creation of a naval reserve; and that Congress might well give further consideration to the question of marine insurance, to the end that there may be established an insurance system which will place American vessels on an equality with foreign vessels in this important respect. These recommendations and suggestions should command the attention of the public and Congress.

Recommendations of O'Neill Report

New York *Times,* December 20.—The complete text of the recommendations with which Commissioner O'Neill concluded his report follows:

1. The present practice whereby foreign steam vessels carrying passengers from ports to ports other than home ports of the country to which they belong, are treated as immune from the requirements of law as to life boats and life preservers, should be abolished. It is plainly contrary to public policy and common sense that the *Vestris* should not have been fully under our regulations because she carried a British flag, and was not examined under the British Board of Trade rules because she did not touch at British ports. Such a practice invites disaster.

2. All vessels subject to our requirements of law as to life preservers should be required immediately to procure life preservers in accordance with the requirements in force since 1919, the purpose of which requirements is to insure a design which will keep an exhausted person's head above water. The present practice of passing life preservers not in accordance with those requirements on the plea that they were pur-

chased prior to 1919 opens the door to subterfuge and, as shown by the experience of the *Vestris*, endangers life.

3. The Steamboat Inspection Service should inaugurate a method of testing life boats for water tightness in cases where due to the leaning of the vessel or for other reasons, the life boats cannot be lowered into the water.

4 All ocean-going steamers and motorships, both freighters and passenger carriers, should be required to install wireless with competent wireless operators capable of maintaining continuous watch. Had such requirements been in force, the *Montogo* could have been alongside of the *Vestris* long before the latter sank.

5. Regulations should be made requiring that all sea connections and piping thereto be located where they may be capable of inspection at sea and repaired.

6. Regulations should be made requiring owners to furnish full and accurate stability data for all vessels using United States ports as bases for passenger traffic and these data be kept up to date. Without such data clearance papers should not be issued.

7. The law governing limitation of liability in case of marine disaster should be amended so that owners may not have the benefit of such liabilities where they have not taken reasonable means to examine and determine the competency of the principal officers of the vessel.

8. The agencies both here and abroad under whose authority examinations of officers and the issuing of licenses to such officers come should study their method of examination for licenses for the purpose of injecting into those examinations larger means of determining the executive ability of the applicant.

9. Present life-saving apparatus should be supplemented by requirements for rafts of approved construction.

10. With the aid of competent technical advisers investigation should be conducted into improved designs of life boats, improved devices for launching life boats and improved designs for life preservers and other buoyant material.

11. There should be created in the Steamboat Inspection Service a technical staff empowered to pass upon the design of all commercial vessels, with respect particularly to construction materials, stability, bulkheads, pumps and other factors asking for stability and buoyancy.

12. The rules and practice should be so changed as to require the thorough inspection of all openings in the shell plating of the ship, such as cargo ports, coal ports, scuppers, and discharge pipes of all kinds.

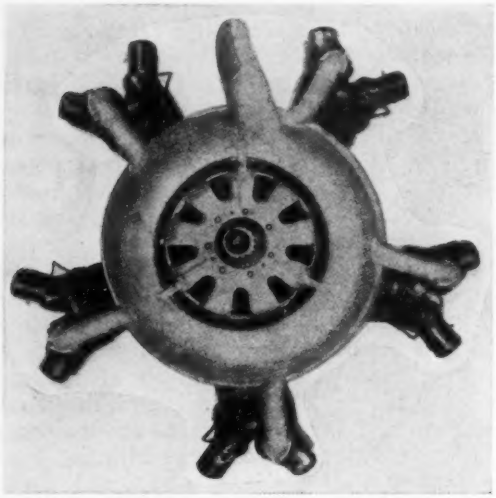
13. A full study should be made, either by Congress or the approaching international conference on safety of life at sea, of the ancient rules of admiralty law as to salvage and limitation of liability on the part of the owners. These rules came into being before the construction of modern rapidly moving ships, and before the wireless enabled vessels at sea to communicate instantly with each other and with the owners on shore. Obviously, the amount of salvage which can be claimed by a rescuing ship may cause the captain of the vessel in distress to delay too long the sending of an appeal for help. So, likewise, the ancient fiction of law whereby the ship itself is treated as solely responsible for any disaster which overtakes it, is, under modern conditions of travel, grossly unjust to passengers and their dependents; and it puts a premium on slackness and penuriousness on the part of the owners in keeping vessels in seaworthy condition and equipped with all modern, scientific devices for insuring stability, buoyancy, and safety.

14. At the same time a full study should be made of the possibility of more humane legislation for the protection of the seamen in the crew. The principle of compulsory workmen's compensation in hazardous employments has become embodied in the statutes of many states. The members of the crew of a sea-going vessel are certainly engaged in a hazardous employment; and, since because of lack of official position they have no control over the management of the vessel, they are exposed to the hazards not only of the sea but also of the ability of their officers. In the event of disaster they and their families have at present no effective redress or compensation whatever.

AVIATION

The Wright "J-6" Series

Aviation, December 15.—In order to complete its line of aircraft engines and provide power plants to cover a wide range of requirements, the Wright Aeronautical



FRONT VIEW OF THE "NEW WHIRLWIND FIVE," WHICH DEVELOPS 150 B. HP. THIS "J-6" MODEL WILL BE PLACED IN PRODUCTION IN FEBRUARY, 1929

Corporation, Paterson, New Jersey, has developed the "J-6" series of engines. This series consists of three "New Whirlwind" models of the four cycle, air cooled, static radial type, having five, seven and nine cylinders and developing 150, 225 and 300 b. hp., respectively. The new engines have been block and flight tested over a period of eighteen months and quantity production will be started on them in the near future.

One of the outstanding features in the design of the new engines is the interchangeability of parts. Practically all of the major units comprising the power plants, with the exception of crankcases, master rods and cams, are identical. The mounting ring radius is 19¼ inches, or the same size as that of the "J-5" Whirlwind, making it possible to install any one of the J-6 series of engines in place of a J-5 model, providing the engine mounting members do not interfere with the accessories which, in the J-6 engine, are all placed at the rear.

The engines are known as the "New Whirlwind Nine," the "New Whirlwind Seven," and the "New Whirlwind Five," and are designated R-975, R-760, and R-540, respectively, these numbers corresponding to the displacement in cubic inches. The standardized bore is 5 inches and the stroke 5½ inches. Because of this ½ inch increase in bore over the J-5 model, it is possible to gain a piston displacement which produces 300 horsepower in the new nine cylinder engine. By the same means an output of 225 horsepower, or approximately the same as that of the J-5 engine, is obtained from the new seven cylinder model, and 150 horsepower from the five cylinder power plant. The seven and nine cylinder engines develop their rated output at 2,000 r.p.m., while the New Whirlwind Five has a normal speed of 1,800 r.p.m. The compression ratio of these engines is 5:1.

The dry weight of the New Whirlwind Nine is 485 pounds, or 1.61 pounds per rated horsepower, while that of the J-5 model is about 515 pounds, representing a reduction of about 30 pounds, even though the new engine has been materially increased in output. The New Whirlwind Seven weighs 425 pounds, or 1.88 pound per rated horsepower. This engine, while comparable in output to the J-5 model, weighs 90 pounds less. The New Whirlwind Five weighs 370 pounds or 2.46 pound per horsepower. The overall diameters and lengths

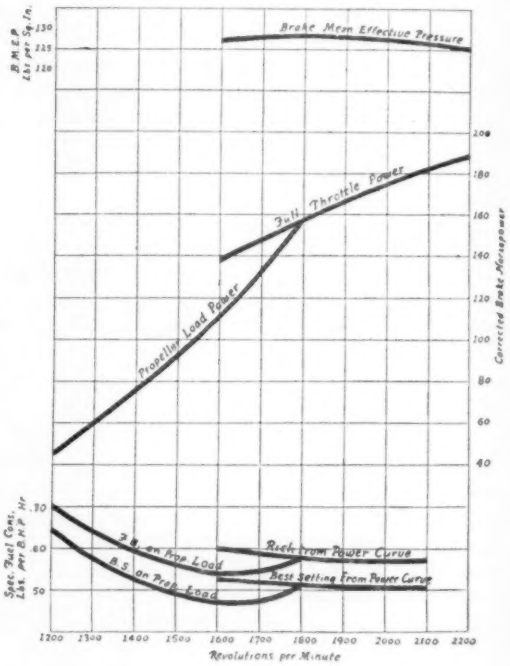

B.M.E.P. Lbs. per Sq. In.
Brake Mean Effective Pressure
Full Throttle Power
Propeller Load Power
Corrected Brake Horsepower
Spec. Fuel Cons. Lbs. per B.H.P. Hr.
W.E. on Prop. Load
B.S. on Prop. Load
Rich from Power Curve
Best Setting from Power Curve
Revolutions per Minute

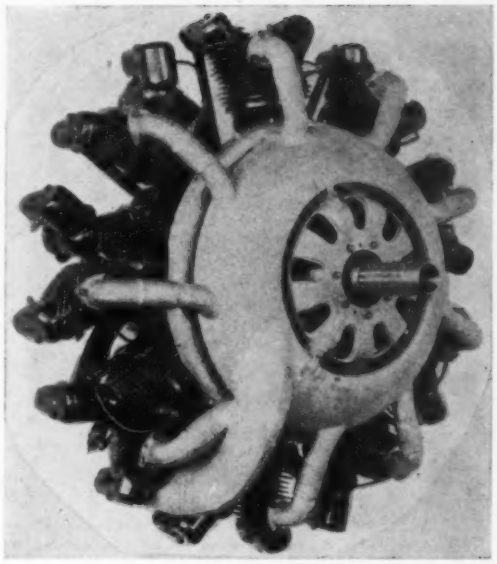
DIAGRAM SHOWING THE POWER OUTPUT AND FUEL CONSUMPTION OF THE NEW WRIGHT R-540 ENGINE

from mounting flanges to propeller hubs, which are the same for all three models,

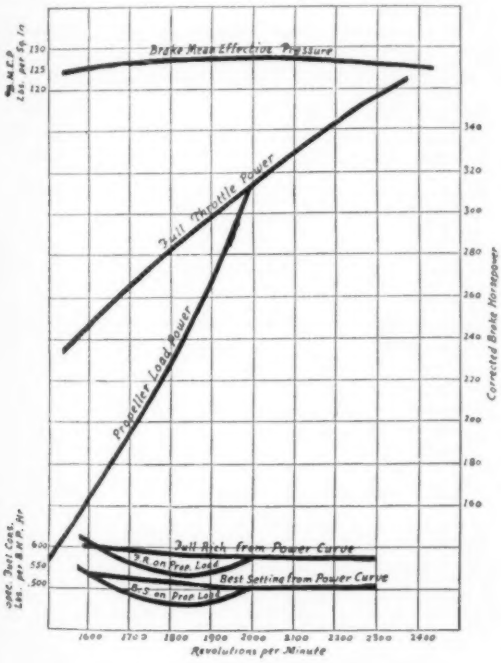
are 45 inches and 28 29/32 inches respectively. The overall length of the nine cylinder engine is 41 7/16 inches, while that of the seven cylinder model is 40 23/32 inches, and that of the five cylinder power plant is 40 5/8 inches.

The first of the nine cylinder engines will be ready for distribution January 1 and production of the five cylinder model is expected to begin in February, 1929. In May, 1929, production is scheduled to start on the seven cylinder power plant.

Each engine will be subjected to acceptance tests which will consist of running in until ready for a preliminary test of 2 hours at 9/10 rated power, at rated speed. Following the preliminary test the engine will be disassembled for inspection and any necessary corrections. The power plant will then be reassembled and submitted to final acceptance tests consisting of one-half hour at 9/10 rated power, at rated speed, and one-half hour at rated power and speed. During the final test, power, fuel, and oil consumption readings will be taken. The guaranteed maximum fuel consumption for all three models is .55 pounds per b. hp. hr. at rated power and speed, and the guaranteed oil consumption .035 pounds per b. hp. hr. also at rated power and speed.



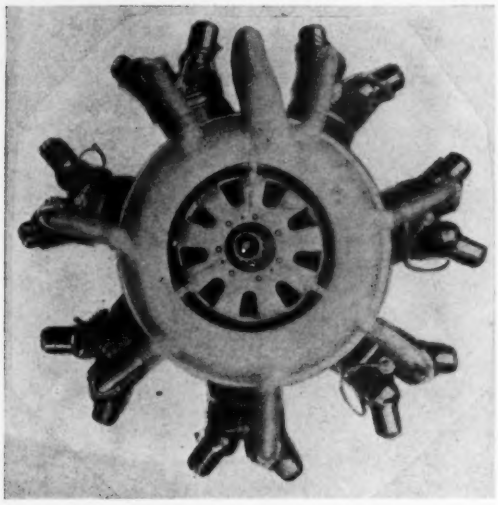
A FRONT QUARTER VIEW OF THE "NEW WHIRLWIND NINE," WHICH DEVELOPS 300 B. HP. AND WEIGHS BUT 485 LB. DRY



A GRAPH SHOWING THE FUEL CONSUMPTION OF THE "NEW WHIRLWIND" MODEL, R-975, AT FULL AND BEST SETTING, AND THE POWER CURVES FOR THIS ENGINE AT FULL THROTTLE AND ON PROPELLER LOAD

A distinguishing feature in the design of these engines is found in the utilization of a front exhaust system. This is a definite departure from previous practice in this country and permits the use of a front exhaust manifold and the attachment of this manifold and nose cowling as standard equipment by the manufacturer. Among the advantages of this system are the reduction in production cost of the manifold and cowling, since it is produced in quantity by the engine manufacturer, and the simplification of engine installation by the airplane manufacturer. At the same time both the head resistance and weight of the exhaust system is greatly reduced, as the entire unit is streamlined into the fuselage form. Each engine is provided, as standard equipment, with the front exhaust manifold, which is of the collector ring type and with this nose cowling, which has manually operated shutters allowing the crankcase temperature to be controlled from the pilot's seat. All engine controls are placed at the rear of the engine simplifying installation in the plane.

By placing the valve actuating mechanism



A FRONT VIEW OF THE WRIGHT R-760, THE NEW SEVEN CYLINDER MODEL OF THE NEW "J-6" SERIES, SHOWING THE FRONT EXHAUST MANIFOLD AND NOSE COWLING

behind rather than in front of the cylinder it is possible to streamline the rocker boxes, which also aids in the reduction of head resistance. Grouping the accessories at the rear of the engine simplifies installation and provides protection against dirt and weather conditions. The increase in speed resulting from these modifications has been demonstrated.

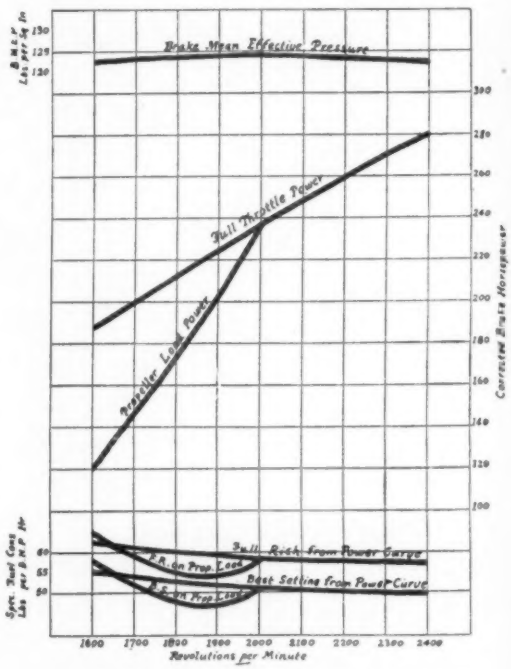
Aluminum alloy cylinder heads are screwed and shrunk over the steel barrel cylinders on each of the J-6 engines. The cylinders are attached to the crankcase by eight steel studs passing through the cylinder flange and have concentric cooling fins. The crankcase assembly consists of four major castings of aluminum alloy which form a sturdy and compact unit. All accessory drives, comprising those for magnetos, oil and fuel pumps, generator and rotary induction system are carried by the rear section. Provision has been made for the installation of both a generator and starter. The cam follower ring carrying the tappet guides is cast integral with the main section of the crankcase, giving rigid and accurate support as well as effective lubrication to the tappets. A number of detail parts are eliminated by this arrangement.

Aluminum alloy pistons, cross ribbed on the under side of the head and fitted with full floating hollow pins are employed. The wrist pin, which has an average diameter of 7/8 inches, subject to certain tolerances, is held in place by expanding spring wire locks which prevent wearing the cylinder walls. Wrist pins and cylinder walls are lubricated by oil spray from the crank and knuckle pin bearings. Piston heads are slightly concave in shape and this feature, in conjunction with the internal shape of the cylinder head, produces an almost perfect spherical combustion chamber.

As is usual in Wright engines, the connecting rods are alloy steel forgings and consist of a one piece master rod and the articulated rods. Wrist pin and knuckle pin bushings are of bronze pressed into the articulated rods and the crank pin bearing is of anti-friction metal, steel backed and pressed, and dowelled into the big end of the master rod.

The single throw, two piece crankshaft is made from alloy steel forgings and is counterbalanced to eliminate vibration. The crankshaft is drilled to provide oil passages giving positive pressure lubrication to the bearing surfaces. The overall length of the standard crankshaft is 21 1/32 inches.

The valve mechanism, including the push



A DIAGRAM SHOWING THE POWER CURVES AT FULL THROTTLE AND ON PROPELLER LOAD, AND THE FUEL CONSUMPTION AT FULL RICH AND BEST SETTING FOR THE "NEW WHIRLWIND SEVEN"

rods, is completely enclosed, and the housing for the rocker arms is cast integral with the cylinder head. Hardened steel cam followers operate through rollers of the same material running on the cam ring, and push rods of hollow steel tubing fitted with case hardened steel ball ends actuate the forged steel rocker arms. The rocker arms are carried on special ball bearings lubricated by the Alemite or Zerk pressure systems, and have provision for the adjustments necessary for correct valve clearances.

Tulip shaped valves of ample area are used with a solid stem for the inlet and hollow stem for the exhaust valves. The diameter of the inlet valve across the head is 2⅜ inches and that of the stem is ½ inch. The exhaust valve diameter across the head is 2 3/16 inches and the diameter of the stem is 9/16 inch. Both inlet and exhaust valves have a lift of 9/16 inch. Three springs are fitted to each valve insuring reliability as the valve can be operated by any one of the springs. The valve springs are helical and are made from special heat treated spring steel wire.

Oil is forced to the rear of the hollow crankshaft by a pressure pump and is distributed to the bearings under pressure. Excess oil drains into a sump located in the main section of the crankcase between the bottom cylinders. From the sump, a single suction pump delivers the oil to the main tank in the plane, passing it through a strainer installed at a convenient point outside of the engine. By this means foreign matter is removed from the oil, and the strainer is accessible for frequent cleaning. No external oil pipes are used in the lubrication system. This feature precludes the possibility of leakage from that source and prevents excessive chilling of the oil in cold weather. Oil pressure is regulated by an adjustable valve.

Two flange mounted Scintilla magnetos at the rear of the engines furnish ignition for the two separately connected spark plugs in each cylinder. Although the magnetos normally operate simultaneously, of course the engines will operate on one magneto with but a slight reduction in speed.

A special Stromberg carburetor of the single barrel type, mounted on the rear section of the crankcase, supplies the mixture which passes from the carburetor to the "diffuser" chamber of the crankcase. This mixture is distributed evenly to all cylinders by the General Electric rotary impellor mounted in the diffuser chamber. This positive control of the mixture, obtained through the particular design of the rotary induction system, eliminates the vibration which would result from irregular mixture distribution. A "hot spot" is provided above the carburetor which thoroughly vaporizes the mixture. This feature serves to insure smooth operation of the engine when using any of the various types of gasoline. The temperature of the hot spot can be regulated from the pilot's seat in order to obtain maximum efficiency and fuel economy under all conditions. Provision also is made to obtain a supply of clean air to the carburetor at all times.

A fifteen ampere, fifteen volt Eclipse generator can be installed as optional equipment on the R-975 and R-760 engines. The first 500 of the R-540 engines, however, will have no provision for generators, according to the present plan. After 500 are produced provision may be made for generators depending upon the demand indicated by the sale of the first 500 engines. While starting equipment is optional, an Eclipse Series 6 electric inertia starter is recommended for the R-975 engine, an Eclipse Series 6 hand inertia starter for the R-760 and an Eclipse hand starter Series 1-HB-6, with a booster incorporated for the R-540.

The specifications furnished by the manufacturer are as follows:

Type	Air cooled, four cycle, fixed radial
Number of cylinders (R-975)	9
Number of cylinders (R-760)	7
Number of cylinders (R-540)	5
Bore	5 in.
Stroke	5½ in.
Displacement (R-975)	975 cu. in.
Displacement (R-760)	756 cu. in.
Displacement (R-540)	540 cu. in.
Compression ratio	5 to 1
Guar'nt'd hp. at sea level (R-975)	300 at 2,000 r.p.m.
Guar'nt'd hp. at sea level (R-760)	225 at 2,000 r.p.m.
Guar'nt'd hp. at sea level (R-540)	150 at 1,800 r.p.m.
Guaranteed maximum fuel consumption	.55 lb. per hp. hr. at rated hp. and speed
Guaranteed maximum oil consumption	.035 lb. per hp. hr. at rated hp. and speed
Length overall without starter (R-975)	41 7/16 in.
Length overall without starter (R-760)	40 23/32 in.
Length overall without starter (R-540)	40 5/8 in.
Diameter overall	45 in.
Weight dry (R-975)	485 lb.
Weight dry (R-760)	425 lb.
Weight dry (R-540)	370 lb.

New British Types of Service Aircraft

Army, Navy, and Air Force Gazette, December 13.—The two new single-seat fighters hereafter described form an interesting contrast in that one—the *Westland Wizard*—is a monoplane fitted with a water-cooled engine which develops an extremely high speed at moderate heights, whereas the other, the *Hawker Hawfinch*, is of the more usual biplane type, fitted with an air-cooled radial engine and designed for operation at extreme altitude.

Apart from two experimental flying boats of the *Inverness* type, and the enormous *Inflexible*—all built by Wm. Beardmore and Company, Limited—the *Wizard* is the first monoplane designed and built for Service use in Great Britain since the war.

THE "WESTLAND WIZARD"

The single wing of this machine is mounted above the fuselage at such a height as to give the pilot a view both above and below it. This wing is of a thick bi-convex section, supported on two narrow vertical central struts and two pairs of inclined steel tube struts running outwards and upwards from the base of the fuselage. In the original machine this wing is of the normal wooden-framed type, but an all-metal wing structure will be used on any future machines of this type.

The fuselage has an all-metal frame, rectangular in section, but provided with light facings to maintain an oval contour on the outer covering. This fuselage is in two detachable sections, joined just aft the pilot's seat. The front section is built of square tubing, steel for longerons and more heavily stressed struts, and duralumin for the more lightly loaded members. All joints are made by simple flat fletch-plates of steel secured to the tubes by hollow rivets. This front section is devoid of wire bracing, the tubular members forming a triangulated system.

The rear section is entirely of duralumin, except for the steel tie-rods used for bracing. Longerons are of square and struts of round tube.

The engine is one of the new Rolls-Royce water-cooled F.XI type, with aluminium cylinder blocks driving the airscrew through a reduction gear. A withdrawable underslung radiator is housed fairly far back along the fuselage, so that when withdrawn partially or wholly it serves to warm the pilot's cockpit. Fuel to the total amount of sixty-eight gallons is carried in two quickly detachable tanks wholly within the section of the wing, one on each side of the body.

The undercarriage is of conventional Vee type with a cross-axle and is fitted with oleo-pneumatic springing gear.

The military equipment includes two Vickers .303 caliber guns with C.C. synchronizing gear firing forward, short wave transmitting and receiving W.T., and slings for four twenty-pound bombs.

The *Wizard* has a span of 36 feet nine inches, an over-all length of 26 feet ten inches, and approximately 260 square feet of wing area. The weight empty is 2,467 pounds, and fully loaded 3,326 pounds. At 10,000 feet the machine has a speed of 188 m.p.h. and at this height a rate of climb of 1,945 feet per minute. The tanks provided give the machine a flight duration of two and one-half hours at 15,000 feet, plus half-hour at sea level.

The Rolls-Royce F.XI engine may be replaced by a similar engine fitted with a supercharger without structural alterations. No data as to the increased performance thereby attainable has yet been issued.

THE "HAWKER HAWFINCH"

The *Hawker Hawfinch* is of metal construction throughout. The wings are built on drawn steel tube spars of the so-called "double-eight" section. The upper wing is of greater span and chord than the lower one, and "N" type interplane struts of steel tube, with the usual streamline wire bracing, are used to interconnect them. The machine has been built with both one and two sets of interplane struts on each side.

The fuselage is constructed of solid-drawn circular steel tubing which has short flats rolled in it at each strut joint. Each side frame forms a rigidly braced structure, triangulated by steel tubes with flattened ends. The struts are fixed to flat fletch-plates by hollow rivets, and the fletch-plates to the flats on the longeron tubes by a single bolt at each joint. These bolts have cup heads.

The two side frames are assembled by the insertion of tubular struts with ball ends which fit the cup heads of these bolts and by cross-bracing wires attached to simple wiring plates also held by the cup-head bolts.

The undercarriage is of the normal Vee type, with cross-axle, with rubber in compression plus an oil dashpot for shock-absorbing.

The engine fitted is the Bristol-Jupiter nine cylinder air-cooled radial, either of the high compression Series VIa, or of the supercharged Series VII type. A tank of fifty-four gallons petrol capacity is lodged in the fuselage.

The military equipment includes two .303 caliber Vickers guns, with C.C. synchronizing gear, 1,200 rounds of ammunition, oxygen apparatus, and short wave sending and receiving W.T.

The *Hawfinch* has a span of 33 feet 6 inches, length over-all of 24 feet 4 inches, and a wing area of 295 square feet. The weight stripped of all instruments and equipment, is 1,835 pounds, and the total load 900 pounds, making the loaded weight 2,735 pounds.

With the Jupiter VIa engine (not supercharged) the machine climbs to 3,000 m. (9,840 feet) in five and one-half minutes and to 6,000 m. (19,680 feet) in sixteen minutes. Her speed at these two heights is 159 m.p.h. and 149 m.p.h. respectively. The service ceiling is 27,000 feet.

With the supercharged Jupiter VII engine 9,840 feet is reached in four and one-half minutes, 19,680 feet in eleven minutes and eight seconds, and the speed at the two heights is 171 m.p.h. and 165 m.p.h. The service ceiling becomes 30,000 feet.

A twin float undercarriage may be attached in place of the normal land undercarriage and the machine converted to a seaplane. The increase in weight is about 300 pounds. As a seaplane the speed at 9,840 feet is 153 m.p.h. unsupercharged, 165 m. p.h. supercharged, and the climb to 19,680 feet is twenty or thirteen minutes and two seconds.

MISCELLANEOUS

The Strategy of Singapore

Foreign Affairs, January, 1929, by Nicholas Roosevelt.—Singapore guards the western gateway of the Pacific. Situated at the extreme southeastern corner of Asia, where the tongue of the Malay peninsula protudes into the East Indies, it is so favored by geography that ships plying between Suez and Japan as well as between India and Australia must pass within a mile of it. Off Singapore the waters of the Indian Ocean, the China Sea, and the Java Sea meet. Like Panama, Gibraltar, and Suez, it is one of the great focal points for shipping, where geography forces far-flung lines of communication to converge.

The strategical significance of Singapore was first appreciated by Sir Stamford Raffles, agent for the East India Company, whose brilliant career and services to the British Empire have never received proper recognition. He it was who in 1819 planted the British flag there, only to be scorned and denounced by the Little Englanders of his day. "It gives us," he wrote a friend, "the command of China and Japan, with Siam and Cambodia, to say nothing of the islands (the Dutch East Indies and the Philippines) themselves." Within a half century of his unsung death the city which he founded was one of the great ports of the world. Today as much commerce flows past it as through Panama or Suez. Its importance as the great eastern outpost of the British Empire is at last being realized, despite the efforts of pacifists and present-day Little Englanders to discredit it. As early as 1882 the first elements of a naval base were laid down, but only in 1921 was it decided to ask Parliament for £10,500,000 to make Singapore the principal naval station in Eastern Asiatic waters.

In order fully to appreciate the importance of Singapore it is necessary to examine the accompanying maps. From these it is clear that Singapore stands on not only the principal trade route from Europe to Eastern Asia, but also the line of communication that ties the Dominions in the Pacific to India and the rest of the Empire. To show the relative distances two circles have been drawn, with a radius of 1,500 and 3,000 miles respectively. Within the smaller circle lie the Dutch East Indies, the Philippines, French Indo-China, Siam, and the Bay of Bengal. The outer circle just touches Japan. The sailing distances, in nautical miles, from Singapore to the principal ports are as follows: Nagaski (the nearest Japanese seaport) 2,415; Hongkong 1,454; Manila 1,370; Port Darwin (northwestern Australia) 1,967; Calcutta 1,646; Madras 1,591; and Colombo, Ceylon, 1,585.

Aside from the general geographical position of Singapore in relation to trade routes, the local features are favorable for the crea-

SINGAPORE'S CENTRAL POSITION ON FAR EASTERN TRADE ROUTES

tion of a naval base with ample storage facilities. Singapore is an island which fits like an egg into the cup of the Malay Peninsula. On the southern or outer edge, nearest the shipping lanes, is the commercial harbor and the city of 500,000 inhabitants who live by its trade. On the northern or inner portion is the site of the base, with ample anchorage space. It is protected from the sea by the surrounding low hills. The outer approaches through Dutch and English owned islands are readily defensible by mines and nets.

The base itself is to consist primarily of docking and storage facilities, rather than of costly defense fortifications. The reason for this is that the British fleet in Eastern waters is at present forced to depend on distant stations for supplies and repairs. This is particularly true of capital ships that cannot be drydocked at any point short of Malta, thirty-one days steaming distance from Singapore. There is at present in Singapore a commercial drydock capable of handling ships of less than 10,000 tons. As part of the new naval base development a floating dock was shipped to Singapore and installed during the latter part of 1928, for the purpose of handling larger ships. At the same time the oil storage facilities were completed, and the provision depots planned with sufficient thoroughness to insure adequate supplies for Singapore so long as it does not fall into enemy hands.

The island is connected with the mainland by a granite and concrete causeway through which runs an aqueduct and over which is an excellent road for motor lorries and a double track railway. The presumption is that in the event of war it would be possible to supply Singapore overland from

some port near the Indian end of the Malaca Straits. This causeway was at one time severely criticized by naval experts because it shut off one of the two sea approaches to the base. The economic consequences of linking the island with the hinterland would seem, however, to outweigh these naval objections.

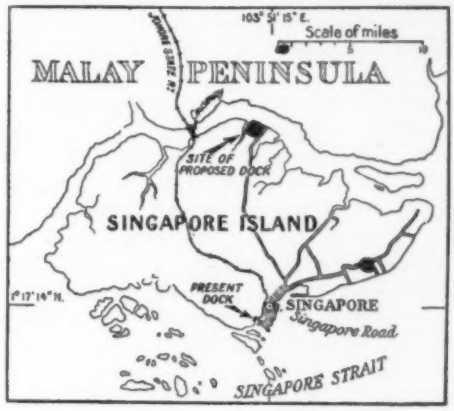
Not only in the United States, where the rôle of bases in naval operations has never been generally understood, but even in England, the question "Why Singapore?" has often been raised.

The answer, apart from the geographical factors already explained, is to be found in a further consideration of the functions of naval bases in peace as in war. The popular conception of a naval base as a highly fortified rocky eminence, like Gibraltar, is largely misleading. While a base must be safe from attack, its chief purpose is to give the fleet greater mobility in important strategic centers. This means primarily to provide fuel and supplies of all sorts, and to furnish adequate docking facilities so that in peace the ships' bottoms may be scraped and in war the necessary repairs made. A fouled bottom reduces a battleship's cruising radius, as well as its speed. In tropical water it is particularly necessary to dock ships frequently in order to remove the rank growth that accumulates on them.

As a matter of fact it may be said that a fleet without a naval base within striking distance is much like an automobile in the Sahara. In war an injured ship has a chance of recovery if it can reach a near base. But if it has to travel many thousands of miles it is in imminent danger of annihilation. The existence of a well developed naval base with drydocks and supplies at Singapore therefore greatly increases the mobility of the British fleet in Pacific and Indian Ocean waters, and so affords to the British possessions in these regions that same degree of protection which other portions of the Empire now enjoy.

The most succinct summary of the wherefores of the Singapore base was made by Mr. Amery, First Lord of the Admiralty, from 1921 to 1924, speaking in Parliament on March 18, 1924:

> Singapore is essentially in a British part of the world. It is actually the point of one of the richest and most progressive parts of the Empire. It is the key to the Indian Ocean, round which lies three-quarters of the land territory of the Empire. The great southern dominions, India, and our East African possessions lie around that ocean. Three quarters of the population of the Empire is around it also. We have not a single base in all that vast region at which a modern ship could be fitted or repaired. . . . . There passes through that ocean every year something like £1,000,000,000 worth of our traffic and a great deal of other traffic belonging to the rest of the Empire. Something like £160,000,000 worth of our ships



> and cargo is afloat in that ocean at any minute of the day. Singapore is the one point from which the whole area can be effectively defended and protected. More than that. If Singapore were an enemy base, there is no other point from which any part of that great area could be protected. It is also the only station on the way to Australia and New Zealand by which the fleet can move to their help. You cannot steam a fleet either from the Panama Canal or the Cape across to Australia and New Zealand. The only route by which help can come to the southern dominions is by way of Singapore. Once the fleet is at Singapore it already covers the approaches to these dominions, and is in the best position to provide them with security.

When the Singapore project was first discussed in Parliament it was attacked on three grounds: that it was a violation of the spirit of the Washington agreement; that it was an aggressive act against Japan; and that it would involve unwarranted and ever-increasing expenditures.

To the first complaint even Mr. Ramsay MacDonald, who was one of the strongest opponents of the Singapore project, took exception in no uncertain terms. Like Lord Balfour, who directed the British negotiations at the Washington Conference, he pointed out that at that conference the boundary of the area delimited in the treaty as that in which fortifications were not to be strengthened was fixed at 110 degrees,

and that Singapore, lying outside the boundary, was knowingly and expressly excepted from the agreement. This was understood at the time by the public as well as by the American, Japanese, and other naval experts. The charge that the base violated the spirit of the Washington Conference may therefore be dismissed as specious.

To the second criticism the defenders of the base pointed out that Singapore is very nearly as far from Japan as England is from the United States. This is too great a distance for a modern fleet to operate successfully in an aggressive action against a strong fleet in its home waters. Furthermore, they pointed out that at the Washington Conference Great Britain had forfeited the right further to fortify Hongkong, and that the withdrawal on Singapore was, in fact, removing their Far Eastern base 1,500 miles farther from Japan. Finally, rather than establishing a new point of attack on the Island Empire, they insisted that Singapore was not directed "against" any nation any more than is Gibraltar or Malta.

To the third charge—that the base would entail increasing expenses—no adequate replies were made in the Parliamentary discussions. But it is interesting to note that the contract awarded in September, 1928, for completion of the base called for an expenditure of only £7,750,000 instead of £10,500,000 as originally demanded.

Even today many Englishmen fail to appreciate the implication of the argument so ably put forward by Mr. Amery and others in Parliament—that Singapore is an imperial, rather than a merely English, base. In fact, the pressure for the construction of Singapore came largely from the Pacific Dominions and colonies. At the various Imperial Conferences the Australian and New Zealand Prime Ministers, supported by Newfoundland and on occasions by Canada, urged the creation of the base so that they might benefit from the protection of the British defense system. In order to show its earnestness, New Zealand contributed a sum of £1,000,000 and the crown colony of Hongkong £250,000. The Federated Malay States donated the land for the base and additional sums. Australia preferred to put her contribution into ships, but her officials never ceased demanding that the base be completed as rapidly as possible. When the Ramsay MacDonald government decided to halt work on the base in 1924, many people in the dominions felt that England had betrayed them and, to use the words of the then Australian Prime Minister, that "incalculable harm" was done to the Empire's prestige.

The British Empire has not been alone in supporting this project. In the Dutch East Indies it has been hailed with enthusiasm and relief. Holland possesses in her tropical islands one of the richest treasure stores in the world. Not only is their present agricultural yield enormous, and their production of oil an important item in the world's supply, but they contain vast scantily-populated areas which promise to be as rich as Java when commensurately developed. This empire is unprotected. Holland's few cruisers in the Dutch East Indies, based on a small naval depot at Soerabaya, would be unimportant against even a second-class naval power. The Dutch have long known that as a result of this they hold the islands only on the sufferance of their neighbors. Hence they are keenly anxious to see the balance of power preserved in the Pacific. They realize that with a strong British fleet based on Singapore, Britain's interests, which, like those of Holland, are determined by the necessity of upholding the *status quo*, would automatically protect the Indies. In fact, with a base at Singapore, Great Britain could never permit the occupation of any of the Dutch islands surrounding Singapore by a power other than Holland. It would not be surprising, therefore, to learn that the already closely interlocked Dutch and British oil interests are factors in the Singapore situation. No agreement has ever been published, but that an understanding of some sort exists is generally believed in the Orient.

The Americans in the Philippines look with just as friendly an eye on the Singapore base as do the Dutch because they, too, care only about the preservation of the *status quo* in the Pacific. They realize that the provisions of the Washington Conference forbidding the strengthening of the existing island defenses, taken in connection with the distance of the islands from Hawaii, makes difficult their defense by the American navy alone. Hence they place much faith in the close community of interests between the Americans, British and Dutch in this section of the world as the

best assurance of achieving the mutually desired peaceful goal.

The weakness of the Singapore base lies in the exigencies of European polities. The size of the fleet which Great Britain can base on Singapore, whether in peace or war, is determined by the demands of the European political situation. An example from history will make this plain. Prior to the German race for naval armament, Great Britain maintained a powerful fleet in Chinese waters, based on Hongkong. As the German fleet began to threaten the English fleet after 1908, it became necessary for the British to withdraw their Asiatic squadron upon the Mediterranean, and ultimately to make their principal concentration in the North Sea. While there is no imminent danger of a new threat from Germany alone, it is more than likely that if England were to become involved in a war in the Far East the enemy would seek to create a situation in Europe which would at least threaten England's lines of communications and so force the immobilization in European waters of an important part of the British navy.

But this does not mean that Great Britain would be defenseless in the East. In a war which threatened the *status quo* in the Pacific she would not be likely to be fighting single handed. None of the Powers in the Singapore area could view with impunity an attack on the possessions of one of the others in that region. Fortunately the likelihood of such an attack is at present infinitesimal. But it is the policy of the British Empire, if not of Holland or the United States, to run no risks in matters of defense and to prefer to make good will doubly sure by preparing for all emergencies. It is not surprising, therefore, to find that despite the fact that England's financial contribution to the base was withheld during the premiership of Ramsay MacDonald, the work was carried on, thanks to funds from other portions of the Empire, and that it is now assured of completion within a few years.

Submarine Warfare

Naval and Military Record, November 28, by Sir Herbert Russell.—The broad divergence of opinion between Great Britain and France as to the lines along which reduction of naval armaments might be effected resolves itself mainly into a question of the value of the submarine. The policy of France is to build a very large number of submarines, comparatively few cruisers, and (apparently) no more capital ships. We are opposed to this plan for the obvious reason that a great French supremacy of submarines in the Narrow Seas would constitute a serious potential menace to ourselves. We do not anticipate war with France, but we must always think of war preparations in terms of war. If there is no international agreement as to limitation of armaments we cannot prevent France from doing just as she chooses in this matter. But it is quite legitimate to try and make international agreement conditional upon some sort of concessional understanding.

The value of the submarine as a commerce destroyer was sufficiently demonstrated during the Great War. The "U" boat campaign came perilously near to bringing this country to starvation. True, before the war had ended we had devised methods for minimizing the peril, but whether these methods could have ultimately countered the steady increase in the numbers of submarines Germany was putting forth is rather questionable. In any case we must take it that the submarine remains the most serious form of menace to seaborne trade. But I do not think that this is the governing idea of French naval policy at the present time. France wants the most economical form of sea defense, and she concludes that this is represented by the submarine. In modernized form this reproduces the doctrine of the Jeune Ecole of four decades ago. France today is not prepared to match ships-of-the-line against ships-of-the-line. She believes she can prevent ships-of-the-line from doing as they please, against her vital points at any rate, by swarms of submarines. This idea, of course, implies localized warfare; probably France would be prepared to let her more remote colonial possessions take their chance whilst the struggle was being fought out.

The value of the submarine against commerce is one thing. Its value against other forms of naval power is quite another. Our losses in warships from submarine attacks were inappreciable as a factor in the Great War. We learnt the lesson early, with the loss of the three *Hogues* and of a batch of

ships in the efforts to force the Dardanelles. One effect of that lesson was to give the submarine the bare minimum of opportunity. Had the submarine not existed there would have been very much more "liveliness" in the North Sea. That she exercises a most immobilizing influence is beyond question. She may not be on the spot at all, but no fleet commander can assume that she is not on the spot. Admiral Jellicoe was haunted by "U" boats throughout the battle of Jutland, and very naturally so. Yet we now know that there were no "U" boats within many leagues of the contending fleets.

The submarine is a most insistent hostage to prudence. The British Navy was never deterred from undertaking what was asked of it by apprehension of submarines. On the other hand, those who had the asking were undoubtedly deterred. They had to weigh the unknown risk of the invisible enemy. That risk added a sort of deadweight to considerations of "worth while." When Mr. Winston Churchill, during the brief phase of preliminary heroics, spoke about our fleet "digging out the enemy like rats from their holes" he forgot to remember the enemy's submarines. The professional men, who did not forget, quietly predicted that there would be no "digging out." They could not yet foresee what was going to happen; they were quite clear as to what was not going to happen. The submarine, more than all the other methods of modern warfare combined, had killed the possibilities of the close blockade. It may be pointed out, as against the submission that she rendered "digging out" an unwarrantably hazardous adventure, that the Zeebrugge and Ostend raids took no account of submarines. But these were designed as night dashes, which must either succeed or fail in the course of a very few hours, and so essentially depended upon surprise. In any case vessels moving through the darkness without lights have little enough to fear from submarines. But I do not think anybody ever seriously suggested that in the early stages of the war a force of capital ships might have attempted a similar exploit against the Jade.

What would be the respective positions, in the event of war of a power possessing all types of warships and a power which had put the bulk of her sea strength into submarines? No strategical thesis can take definite shape without reference to the geographical conditions, and we will, therefore, assume that the belligerent countries are quite close to one another. In fact, such a proposition inevitably suggests a naval conflict between Great Britain and France and, simply for the purposes of strategical considerations, why not say so? Our traditional principle has been "to seek out the enemy and destroy him." This very sound doctrine endured without much question down to the opening of the Great War. It was only when, in fulfilment of it, "digging out" was talked about that there came the realization of how far "circumstances had altered cases."

What could we do against, say, 300 submarines concentrated in the Channel, and what could 300 submarines in the Channel do against our great composite fleet? Let us call the submarine power "Red" and ourselves "Blue." Red envisages intensive war against Blue commerce as about the only directly aggressive policy open to him. He depends largely upon the moral factor of his numerous elusive flotillas to prevent Blue from attacking his Channel ports, but in proportion as he concentrated in the Channel so must he leave his Mediterranean littoral exposed. In surface vessels he would be no match for Blue.

Three hundred hostile submarines in the Channel would render it impassable to commerce. Germany came near to achieving this result with about one-half the number. Portsmouth, Plymouth, and Chatham would be very "unhealthy" spots. They could make themselves reasonably safe against submarine attack, but the approaches to them would be so perilous as very seriously to retard freedom of naval movement. We must assume that mines would be strewn as thickly as the leaves in Vallambrosa both by Red and Blue.

Red would sacrifice his blue water communications from the outset. His sea-borne trade would practically vanish, and his colonial possessions would be isolated and left open to attack. His sole chance would seem to lie in starving Blue into making terms. What could Blue do to counter this game? In the first place the paralyzing of Red's ocean trade would heavily cripple him. In self-contained endurance he could outlast Blue and he could likewise get supplies

across his land frontiers. On the point of economic survival (using the term in its war sense) the odds are in his favor. But the British navy today views the submarine as a reduced menace. We now build ships which, we believe, can stand being torpedoed two or three times without going to the bottom. Our methods of submarine detection are very effective. Although it remains true that no fleet commander is going to hazard his capital ships and cruisers in submarine-infested waters on the old spacious plan of "hunting out the enemy," yet today he could view such an enterprise more confidently than during the Great War.

If I were writing a story upon such a war as this I should promptly despatch powerful Blue Forces to try and seize some of Red's principal Channel ports, which would likewise be his principal submarine bases. You can do what you like in fiction. But as I am not writing a story I permit myself to ask what would be the situation of any force which might succeed in seizing a principal enemy port. It would draw submarines to it like bees around a honey pot. It would probably have little trouble with the permanent defenses when once it was inside; it would soon have plenty of trouble with mobile land defenses. In short, it would only end in demonstrating the old truth that naval attack upon a land position can only yield lasting results when successfully accompanied by land operations.

The whole proposition is a novel picture, and gives plenty of scope for both strategical planning and tactical plotting. Invisible guerilla warfare on an intensive scale presents a pretty knotty problem. It neutralizes so many of the precepts which had been confirmed by centuries of experience. The capital ship dominates the surface of the sea. She is prepared to match her strength against anything she can see. But what is she to do in a game of blind man's buff? In the Great War she held the ring for the lesser craft by keeping the High Seas fleet bottled up. In such a war as we are here assuming there would be no corresponding objective for her to bottle up. The few hornets in the wasp's nests would not make very much difference; it is the wasps that would be doing the stinging.

We are told that had the High Seas fleet been decisively defeated at Jutland the "U" boat campaign would have been impossible. I still have to discover why. Does this mean that the Grand fleet would then have swooped down upon the German ports and collared them? If so, it means that it was the High Seas fleet which precluded such a swoop. But, since the Grand fleet was so much stronger than the High Seas fleet and always so keen for a meeting, why did it not swoop upon it? If, as I suggest, the answer lay in submarines, mines, and land defenses, that answer would have, continued to exist had the High Seas fleet been decisively defeated.

No country would so heartily welcome the abolition of the submarine as our own. We can do our fighting very well without it, but on the other hand, it stultifies our scope for fighting. The old tactical principles become like a palimpsest; beneath is an evasive vision. In time to come the relation between the aircraft and the submarine may dispel the palimpsest by bringing the evasive vision to the surface, wiping out the big ship entirely in the process. For the present we must be content to deal with realities, and these are puzzling enough in all conscience.

CURRENT ARTICLES AND BOOKS

"Erosion of Rifled Bores," by D. C. McNair in *Army Ordinance,* November-December, 1928.

"Spotting for Anti-Aircraft Artillery," by Capt. L. H. Thompson, in *The Coast Artillery Journal,* December, 1928.

"What and Why in China: a study of Chinese affairs," by P. Hutchinson.

"Without Censor: new light on our greatest World War battles," by T. M. Johnson.

"Fourteenth Annual Report of the National Advisory Committee For Aeronautics, 1928."

NOTES ON INTERNATIONAL AFFAIRS

From December 3 to January 3

Prepared by Professor Allan Westcott, U. S. Naval Academy

CLASH BETWEEN PARAGUAY AND BOLIVIA

Border Hostilities.—In the midst of the League Council session at Lugano and the Pan-American Conference on Arbitration and Conciliation at Washington, came the upsetting news that Bolivia (population, 2,150,000) and Paraguay (population, 850,000) were on the verge of war. The trouble began in border territory long in dispute between the two countries, a largely uninhabited wilderness known as the Chaco, between the Paraguay and Pilcomayo Rivers. On December 7 the Bolivian garrison in a small border fort, Vanguardia, was attacked by a force of Paraguayans and most of their number were killed or captured. According to the Paraguan story the fort was in their own territory and the garrison had been previously requested to evacuate. Within a few hours diplomatic relations were broken and ministers sent home. In view of the relative sizes of the two countries, Bolivia was apparently more eager for war than Paraguay, and it was said that she had been planning hostilities since the suspension last August of the work of a commission attempting a peaceful settlement of the boundary dispute. Both nations mobilized their reserves and sent troops to the frontier, where there were numerous clashes, Bolivian forces reoccupying Fort Vanguardia and capturing a Paraguayan outpost in the disputed area.

Peace Machinery in Action.—The South American war scare gave opportunity to set in motion the elaborate peace-making machinery which has been created since the World War, and which was soon working so efficiently that the two little countries were practically forced to come to terms. The Pan-American conference at its first meeting in Washington on December 10 at once appointed a mediation committee of five, composed of delegates from Chili, Brazil, Peru, Cuba, and the United States, and sent cabled appeals. Paraguay on the same date sent a request for intervention to the League of Nations and interest was keenly aroused to see what action the League would take in this affair involving possible conflict with the Monroe Doctrine. Premier Briand, as president of the council, after much hasty consultation, sent each nation the other's communications, with urgent warnings to observe their obligations under the League covenant. The League cable tolls due to the affair amounted to about $26,000. As finally arranged, and stated in the replies of the two governments to Premier Briand, it was "at the suggestion of the League Council" that they "accepted the good offices of the Conference of Conciliation and Arbitration meeting in Washington." This reply, sent by Paraguay on December 17 and by Bolivia on December 18, was considered a neat solution relieving the League from undue interference in American affairs. The replies were transmitted by Premier Briand through the American representative in Paris to Secretary Kellogg, not as a United States official, but as chairman of the conference. Delegates from both Paraguay and Bolivia were present at the meeting of the special committee in Washington on December 17, at which the Bolivian delegate, while protesting his country's pacific intentions, insisted on military retaliation, and declared that no country, up to the present, had "endured the humiliation of an affront by

bringing down its flag to replace it on the mast by the insignia of arbitration." A protocol was drawn up and submitted to the two countries providing for nine judges for investigation and conciliation, two to be appointed by each of the countries concerned and the other five by Brazil, Cuba, Uruguay, and the United States. Six months were allotted for investigation, with six more if needed. The judges will not attempt to settle the boundary dispute, but will determine responsibility for hostilities and means of conciliation. This plan was accepted by Paraguay on December 29, and by Bolivia two days later.

UNITED STATES AND LATIN AMERICA

MR. HOOVER IN SOUTH AMERICA.—President-elect Hoover's South American tour ended with his departure from Rio de Janeiro on December 23, after a particularly enthusiastic reception in the Brazilian capital. On the west coast he visited Salvador, Nicaragua, Costa Rica, Equador, Peru, Bolivia (by a luncheon with Bolivian officials in the harbor of Antofagasta), and Chile, and on the east coast Argentina, Uruguay, and Brazil. On the return voyage Mr. Hoover spoke warmly of the co-operation of naval officers in creating friendly feeling in each country visited. The visit was generally referred to as perhaps the most important event in Pan-American relations in a generation, in its effect of increasing mutual confidence and understanding and stimulating friendly intercourse.

PAN-AMERICAN ARBITRATION CONFERENCE.—The conference of experts from twenty American nations to draft conciliation and compulsory arbitration agreements, as provided by the Havana Conference last winter, held its first meeting in Washington on December 10, and continued through the month. President Coolidge gave a speech of welcome emphasizing the advanced stand of American nations in peaceful settlement of disputes, and Secretary Kellogg was made chairman. An inauspicious element in the opening was the fact that Argentina had declined to send a delegate. Another was the impending war between two member nations, Paraguay and Bolivia. In this last matter the conference acted promptly, appointing a special committee at its opening session and ultimately securing a peaceful settlement.

The conference appointed two committees, one to prepare a conciliation convention, and the other an arbitration convention, and by the close of the month each had brought its work to completion, subject to acceptance by the whole conference. The conciliation treaty draft was described as consisting of a preamble and seventeen articles. It was based on the general principles: (1) that the processes of conciliation should be obligatory; (2) that any signatory nation should have the right to request conciliation; (3) that attempts at conciliation by a third nation should not be regarded as an unfriendly act; (4) that a permanent organization for conciliation should be established; (5) that the aim of conciliation should be first to prevent overt acts of hostility and second, to bring the parties to accept arbitration if settlement by conciliation proved impossible. The arbitration committee encountered more difficulties, especially as the Colombian delegate, who was chairman of this committee, had definite instructions from his government that arbitration of pecuniary claims would not be acceptable. However, a draft treaty was finally completed. This established the principle of compulsory arbitration for all disputes except those affecting the domestic jurisdiction of states and those involving third parties. In ratifying this convention, nations will be at liberty to make such reservations as they please in addition to those above. Disputing countries may agree among themselves as to type of arbitration tribunal, but if agreement fails they will each appoint two judges, select two from the Hague Court, and ask the latter to name the seventh member.

UNITED STATES AND EUROPE

AMERICANS IN REPARATIONS PARLEY.—On December 24 the American State Department, through the British Ambassador, announced the willingness of this government that two American delegates, acting as individuals and not as government officials, and selected by the six nations concerned, should serve on the committee of experts which is to attempt a final solution of the reparations problem. Most prominent among the Americans mentioned were: Owen D. Young, Dwight W. Morrow, General Dawes, and J. Pierpont Morgan. As

neutral members, the American delegates are likely to play an important part in the committee, which will attempt to settle the amount and duration of German payments, as a preliminary step toward their conversion into merchantable form. The first meeting of the committee will be in Paris early this year.

REPARATION SETTLEMENT.—The Foreign Policy Association bulletin of December 21 is a review of "War Debts and Reparation: a Statement of the Problem." The summary of conclusions runs as follows:

The first and most pressing need is for a definite statement of Germany's obligations. This is demanded not only because the German people have a right to know what is expected of them but also in order that the people of the Allied countries may know how they are to meet their own obligations under the war debts. In fixing the amount that Germany shall be required to pay, Germany's true economic capacity must be honestly determined.

The most important factor in determining Germany's capacity to pay is in finding out how much she can reasonably be expected to transfer to foreign countries in goods and services unaided by a transfer committee, and without resorting to foreign borrowing. There are several possible ways by which Germany can secure the foreign exchange to meet her debts abroad.

1. The first is by a change in her present trade balance of such magnitude that it will not only wipe out her present excess of imports over exports but also give her an export balance sufficiently large to meet her annual reparation payments. In order to do this, Germany must find foreign markets. In this, however, she will be handicapped by the high tariff policies of most of the nations of the world.

2. The second method by which Germany can meet the obligations fixed upon her is by acquiring a heavy export balance in the so-called "invisible" items; *e. g.*, tourist expenditures, freight payments, insurance transactions, etc. This must be sufficiently large to offset both the import balance on merchandise and precious metals and at the same time take care of her reparation obligations.

It is obvious that any combination of the two methods outlined above would bring about the same result. The important fact is that Germany must have an export balance on all current items (visible and invisible) sufficient to meet her payments to her creditors.

3. Finally, it is possible for Germany to pay the amount fixed without an export balance on these items provided she continues to borrow the amount she is required to pay. This, in fact, is what she has been doing since the adoption of the Experts' Plan. It is obvious that by this method she is not making a real settlement of her obligations but only changing their form. It is impossible for this situation to continue indefinitely. Sooner or later her payments will become so large that default in her obligations is inevitable.

Assuming that Germany's obligations have been fixed within a reasonable and economic conception of her capacity to pay, the problem that remains is one of taking the whole matter out of politics and putting her obligations in the hands of private investors. This is involved in the so-called commercialization arrangements outlined above.

In order to do this, it is necessary to take account of the Allied indebtedness to the United States. When the European Governments have agreed upon the amounts Germany shall be required to pay, they will then be in a position to make a cash offer to the United States with some assurance of at least its sympathetic consideration. When it becomes clear that the United States will receive cash with which to pay off a portion of its public debt, there is the possibility that the offer may be accepted.

ARMS CONFERENCE IN APRIL.—Following discussions at the Lugano meeting of the League Council, League officials at the close of December announced that another meeting of the Preparatory Committee for a Disarmament Conference would be held on April 15 at Geneva. The League Assembly ordered last September that the meeting should be held at the end of 1928 or beginning of 1929, but it was postponed largely because of the American change of administration. It is understood that the Soviet proposal for partial disarmament of all nations will be the main item on the agenda, and there will be renewed discussion of naval limitation, although there is no prospect of preliminary agreement among the naval powers. Secretary Kellogg stated that he saw no reason to change the American delegates, who at the last meeting of the committee were our Ambassador to Belgium, Hugh Gibson, Minister to Switzerland, Hugh Wilson, and Rear Admirals Hilary P. Williams and Andrew T. Long as naval experts.

The commission attempting to draft a treaty for control of arms manufacture, under the chairmanship of Count von Bernstorff, will meet at Geneva on March 11, taking up the scheme for classification of armaments suggested by Belgium. Minister Hugh Wilson of Switzerland is the American member.

ANGLO-AMERICAN NAVAL RIVALRY.—A discussion of "The Threat of Anglo-American Naval Rivalry," by Allen W. Dulles, legal adviser of the American delegation at the Geneva Naval Conference, is the leading

article in January *Foreign Affairs*. The bulk of the article is a review of developments since 1922, and a sharp criticism of the discarded Anglo-French agreement of last summer. The article reads in part:

The Three-Power Naval Conference and the Anglo-French negotiations have now been submitted to the critical analysis of the press, of public opinion, and in certain cases, of the governments interested. The following points stand out as crucial:

First. A basis for agreement between the United States and Great Britain is a necessary preliminary to any general understanding on naval limitation. Until this can be achieved there is little to be gained by naval discussions such as have been carried on by a large number of powers through the Preparatory Commission at Geneva or by conversations such as those between Great Britain and France.

Second. No basis would be satisfactory which did not cover all types of effective combatant vessels not already limited by the Washington Treaty.

Third. The tonnage limits fixed as between the United States and Great Britain should be on the basis of parity in each class, should be reasonable in amount, and not appreciably in excess of the present strength of the stronger of the two powers in any particular class. In the case of certain classes of vessels limits might be fixed below the present levels of construction.

Fourth. In the matter of types, within the cruiser classes, both Great Britain and the United States should be prepared to make concessions in order to bridge the gap between their two points of view. Great Britain should abandon the contention that the United States restrict its cruiser force chiefly to the small type of cruiser or shape its own naval program to suit the asserted needs of the Empire for this type. On the other hand, the United States might properly be asked to consider the British claim that the use by the United States of its cruiser tonnage for the construction of the larger eight-inch gun cruisers would give combat superiority even though there were tonnage equality; that is, parity of combat strength and not alone parity of tonnage should be considered.

It is not easy to find a formula which takes satisfactory account of the fact that tonnage is not the sole criterion of naval strength. The Washington Treaty fixed the tonnage of each battleship to be built and the size of its guns so that tonnage and combat parity would be achieved. In the cruiser class—and it is only here that the question is acute—an effort might be made to arrive at substantial combat parity by estimating six-inch gun cruisers "at a discount" for the purposes of naval limitation. For example, 100,000 tons devoted exclusively to eight-inch gun vessels would count as 100,000 tons, but 100,000 tons devoted exclusively to six-inch gun vessels might, for the purposes of the limitation treaty, count as 90,000 tons. These figures are purely arbitrary, and are taken merely to illustrate an idea not to suggest what may be the relative combat value of the two types of vessels, which at best is a matter of conjecture. Incidentally, a somewhat similar suggestion was incorporated in the draft disarmament treaty submitted by France to the Preparatory Commission in 1927, but on that occasion applied to the element of age not to that of gun caliber: "In assessing total tonnage, a fraction only, equal to . . . . per cent of the real tonnage, shall be reckoned in the case of vessels of war which exceed the age limit laid down in Article 17."

Another method of attacking the same problem is apparently hinted at in the recent American note on the Anglo-French compromise. The plan suggested is that a part of the tonnage primarily allocated to one class be made available for the construction of vessels of another class. In this way, for example, Great Britain, which desires a considerable number of smaller cruisers, could devote to them a part of its destroyer or possibly even its submarine tonnage. This allocation of tonnage between classes of vessels (originally a French suggestion) could be availed of to help adjust and maintain the parity of combat strength.

COUNCIL SESSION AT LUGANO.—The December session of the League Council was held at Lugano beginning December 10, interest centering chiefly in conferences of the British, French, and German foreign ministers about reparations, evacuation of the Rhineland, the coming arms parley, and the war scare in South America. The delegates in the Council from the three Latin-American countries, Cuba, Chili, and Venezuela, had a special conference with M. Briand in which they suggested that, in view of the return of Argentina into the League fold, South America would in the future play a more prominent part in League affairs, and there would be increased opportunities for mutual support between the League and American members. This looked as if the South American states were seeking to make the League a counterpoise to the United States in American affairs.

The Council sent a spirited reply to Secretary Kellogg's note of last October in which he declared the Geneva Opium Convention of 1925 a step backward and declined to appoint delegates to the central board for its enforcement. The Council's reply argued that the new agreement was the only one possible, and did not weaken the previous agreement at The Hague.

SENATE STUDIES PEACE PACT.—Just before the Christmas recess the Senate Foreign Relations Committee by a vote of fourteen to two reported favorably the Kellogg Peace Treaty. Along with it went, without comment, Senator Moses's resolution proposing

that the Senate express its "understanding" that the treaty "does not impose any limitation on the Monroe Doctrine or the traditional policies of the United States." It was agreed in the Senate that the treaty would be taken up concomitantly with the Cruiser Bill. It appeared likely that it would be ratified without qualifications, though both Senator Moses and Senator Reed strongly favored a reservation, similar to the British statement about "regions of vital interest," regarding our rights in the Caribbean, Philippines, and elsewhere.

DELAY OVER ANGLO-AMERICAN ARBITRATION TREATY.—According to statements of Washington officials the new arbitration treaty which the United States submitted to Great Britain two years ago has not yet been definitely accepted. It is believed that the British Foreign Office is considering a reservation which would create a "British Monroe Doctrine" for certain regions of vital interest such as Egypt and the Suez. Japan also has failed to ratify the similar treaty proposed two years ago, and following the British lead may suggest a Monroe Doctrine for Manchuria.

The old arbitration treaty between England and the United States expired last June. The new draft, like the old, reserves from arbitration questions affecting the Monroe Doctrine.

SOUTHERN EUROPE

RUMANIAN ELECTIONS.—The parliamentary elections in Rumania were overwhelmingly in favor of the Peasant Party, which has 110 seats out of about 160 in the Senate and 355 of the 376 seats in the Chamber. Thus, so far as parliament is concerned, Premier Maniu will have a free hand.

MUSSOLINI'S ONE-MAN CABINET.—By taking over himself the Ministry of Colonies on December 18, Premier Mussolini now holds seven of the thirteen portfolios in his cabinet. He is Minister of Foreign Affairs, Internal Affairs, Army, Navy, Aëronautics, Corporations, and Colonies. The ousted Colonial Minister, Federzoni, has been the cabinet member most friendly to king and church.

The last democratically elected parliament in Italy ended in December. The next will consist of members nominated by the Fascist Grand Council, and as the Premier said, will be "100 per cent Fascist."

FAR EAST

NEW CHINESE TARIFF.—Following the conclusion of tariff autonomy treaties with the United States and Great Britain, the Nanking Government published on December 10 the new tariff schedule which is to go into effect on February 1. Foreign importers were somewhat relieved to find that the new rates provide for an average tariff of only 18 per cent, as compared with the former tariff of 5 per cent plus 2.5 per cent surtax. Gasoline is taxed seven cents, gold, a gallon, automobiles 22.5 per cent, cotton 10 per cent. Japan refused to accept the new tariff, in view of unfinished negotiations for a new commercial treaty between the two countries, but it appears inevitable that Japan must fall in line with other nations or suffer loss of trade.

BRITISH RECOGNITION.—After the signing of a customs autonomy treaty with China on December 19, the British Minister Sir Miles Lampson on the next day formally presented his credentials to President Chiang Kai-Shek and the British cruiser *Suffolk* fired a twenty-one-gun salute, thus completing formal recognition of the Nanking Government. The salute was the first accorded the new government by a major power. Although American recognition was accorded last August, arrangements for a salute were cancelled owing to a minor difference between Minister McMurray and Foreign Minister Wang.

U. S. CONSULATE REOPENED.—The American Consulate at Nanking, closed since the outrages of March, 1927, was reopened December 15. No formal ceremonies accompanied the reopening.

AFGHAN REVOLT.—A revolt of the military forces in Afghanistan, attributed to efforts of the king to introduce western clothing and customs, caused serious street fighting in Kabul during the early winter. European women and children have since been evacuated by British airplanes from Kabul to India. It was reported that King Amanullah still held control in the capital, and that hostilities were held up by cold weather.

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THE ELECTRIC WORD—THE RISE OF RADIO

By Paul Schubert, New York: Macmillan Company, 1928. $2.50.

REVIEWED BY LIEUTENANT C. W. BREWINGTON, *U. S. Navy*

This is not "just another book on radio." It is a different kind of radio book. It does not pretend to be a scientific text; nor is it a popular exposition of radio principles for the beginner. First and last it is a narrative—a narrative of the rise of radio from the first experiments by Marconi to its present-day position of eminence. The business, political, and diplomatic intrigues accompanying the development of this branch of science makes a fascinating story, and Mr. Schubert has told it well.

The author, a former naval officer, has done a great amount of research work in collecting his material. The book has an *acknowledgment* instead of a *preface,* in which he gives some of the sources of his material, and it is of interest to note that much of it came from the historical section of the Navy Department. The part played by the Navy in gaining a position of supremacy for the United States in the radio field after the World War is little realized—particularly the parts played by Admiral W. H. G. Bullard and Captain S. C. Hooper. Had it not been for these two naval officers this country would probably be as dependent on Great Britain for our world-wide radio communications as we are for cable communications. It was due to their efforts that the Radio Corporation of America was organized.

This corporation is a unique organization in many ways. Its by-laws provide that no person who is not a citizen of the United States can hold office, and that not more than twenty per cent of the stock can be held and voted by foreigners without restrictions. There were other important and interesting provisions to insure the above. Quoting from the author we find that ".... the Secretary of the Navy or his agent was to be privileged to challenge the vote of any such stock if the contrary was believed to be the case. The board of directors invited President Wilson then, to appoint a government representative to sit with them at their meetings and participate in the company's administration .... and the President appointed Admiral Bullard." Although the General Electric Co. was the parent of the R.C.A., due principally to patent and concession holdings of other companies, such as the American Telephone and Telegraph Co., the Western Electric Co., the Westinghouse Electric Manufacturing Co., the United Fruit Co., etc., they were rapidly taken into the fold. The R.C.A. now has back of it several billion dollars in resources and some of the nation's foremost business men and scientists.

The R.C.A. then took over in earnest the old Marconi slogan "World-Wide Wireless" (they had bought out the American Marconi Co., which was controlled by the British parent organization) and by August, 1928, had lived up to the slogan to the extent

of establishing circuits to twenty-six foreign countries.

The above will give some idea of the type of material contained in the book. It is not all devoted to the inception and organization of the R.C.A. by any means, though this will probably be of greatest interest to Americans. Great Britain's vacillating policies and plans are covered, the story of the struggle for the radio monopoly in China is told, and of course the phenomenal growth of broadcasting in the United States receives its full shore of attention.

The author divides his narrative into three books. The first is "The Era of Maritime Adoption"; then comes "The Era of Military Use"; followed by "The Era of Popular Use." The treatment and style is excellent. The book is valuable alike to the engineer, business man, and layman.

PSEUDO-SECURITY

By J. M. Spaight. New York: Longmans, Green and Co. 1928. $5.00.

REVIEWED BY REAR ADMIRAL W. L. RODGERS, *U. S. Navy (Retired)*.

This interesting and instructive work is devoted to an analysis of the effectiveness of the League of Nations as a means of enforcing peace. The conclusion is that it may not be expected to do so, and that the safety of nations lies in their own readiness for war. The book is clear and well written, although probably few naval officers would agree with the writer on the supremacy of the air arm, of whose efficacy he has long been an advocate. The author is a distinguished authority on international law, and has had the advantage of representing his country upon international questions; he therefore writes with a sense of responsibility which is often lacking among writers who deal with questions of war and peace. The contents should be mastered by naval officers, all of whom are liable to be asked at any moment to justify the national defense and their own continuance as servants of the people.

The writer briefly acknowledges the admirable work done by the League in the way of the removal of causes of conflict, in conciliation, and for international coöperation for human welfare. Yet, while recognizing the wide field of useful effort open to the League in these directions, he thinks that as a means for the application of force to prevent war, the League is not only useless, but that reliance on it would promote aggression.

The idea of "pooled security" of right and justice guaranteed by a powerful league is a generous one making a great appeal. Expressed in the formula "Arbitration, Disarmament, Security," it seems logically complete. But, unfortunately, upon many questions nations will refuse arbitration, and under-armament he thinks more likely to promote wars than over-armament. Security—the third constituent of the formula—depends upon the certainty that all the members of the League will never fail to support a threatened fellow member. Such a general guaranty by the League involves a commitment to which the more important members of the League decline to hold themselves bound, for democratic states will not go to war unless their own vital interests are concerned.

The Covenant of the League is ineffective to prevent wars; first, because it recognizes six causes for lawful wars; second, because in the guaranty clause (Article X, which kept the United States out of the League), in which members "undertake to respect and preserve as against external aggression the territorial integrity and existing political independence of all members of the League," other nations have seen the same objections as did the United States, and interpretation by interested parties has served to destroy its importance. It seems to be now admitted that each member state will "decide in what degree each member is bound to assure the execution of this obligation by employment of its military forces." Apparently also, the states themselves, and not the League, will decide if a given case calls for their action. Further, the executive authorities in some cases may plead that their legislatures decline action. Unmobilized nations whose aid is demanded by the League may well hesitate to act and thereby incur risk of attack by a mobilized "aggressor." As a guaranty the clause is only a pseudo-guaranty.

But the Covenant also provides sanctions, or punitive measures, against a state which resorts to war before trying pacific means of settlement. These sanctions are in Article XVI of the Covenant and are of two kinds, economic and military. With great nations outside the League, the economic penalty, or boycott, is unsatisfactory, because its enforcement by blockade is a war measure, and the boycott assumes to be a pacific mea-

sure, thus making an efficient blockade impracticable. Besides, the boycott may hurt the boycotting power more than the "aggressor," and in any case, the boycott will be slow in operation while the "aggressor" is acting vigorously.

As for the military sanction, several powers have already declined to admit any obligation to act, and on the other hand, it will seldom seem to any state and her friends that she is an aggressor. To remedy this situation, in 1923 and 1924, proposals were submitted to the League for enforcing peace by League action. These proposals have been denounced as contrary to the true object of the League, which is to promote international coöperation and conciliation and thereby achieve international peace. The difficulty with the first project was that there was no definition of aggression. The next year, 1924, the Geneva Protocol undertook to pledge all powers to turn against the "aggressor"; but instead of defining aggression, it offered certain "presumptions of aggression." These, too, were open to objection. Although the Protocol was signed at Geneva, it was subsequently rejected by Great Britain and is now without weight.

The author then turns to the effect of aviation on national defense and believes that this new means of warfare makes it more necessary to rely on national defense in preference to the League than would have been the case without aviation. This belief he justifies by pointing out that civil aviation is bound to increase and that if national armaments are reduced, commercial machines available for bombing can quickly be put to use by an attacking nation. No defense can be made to such sudden attack by the slow-working machinery of the League, and the only efficacious defense will be a powerful national force of fighting planes.

The writer further points out that it will be no satisfaction to an attacked nation to know that after the "aggressor" has inflicted injury the League will be under the obligation to impose a penalty. But as to such an obligation, there is no penalty for the members of the League who refuse to execute their commitment to enforce peace, and thus the security which the League offers is a sham which no country can trust. Consequently, it is best for nations to rely on their own armaments for defense and to make such alliances as seem wise to promote their security. The League, as the writer believes, should renounce its present pretense of guaranteeing or enforcing peace and confine itself to the great task of facilitating the peaceful settlement of disputes and promoting the general welfare of nations.

PRACTICAL FLIGHT TRAINING

By Lieutenant Barrett Studley, U. S. Navy. New York: The Macmillan Co. 1928. $5.00.

REVIEWED BY LIEUTENANT VERNON F. GRANT, *U. S. Navy*

"Flying," writes Lieutenant Studley, "cannot be learned from a book." This is undoubtedly true as a general statement, but if any of the fundamentals and fine points of the art of flying can be absorbed by the average individual from books, lectures and the like, the author of *Practical Flight Training* affords every opportunity. The book is the result of long experience and exhaustive study at Pensacola, the Navy's flight training station, upon the part of the author and his brother officers, who have instructed hundreds of flight students since the World War. Lieutenant Studley himself has been engaged in this work for some years, at San Diego, and at Pensacola. Those who remember his excellent article, "Flight Training of Student Aviators" (NAVAL INSTITUTE PROCEEDINGS, July, 1927) will be pleased to know of the present manual.

The book is painstaking, thorough, and remarkable for its clarity. It is arranged in five parts, the chapters successively taking up the subjects a flight student would take up in order during his course of training. The five parts consist of introduction, essentials of aviation training (which includes both air and ground instruction), elementary flying, advanced flying, and training organization. Illustrations are profuse, and many original and striking diagrams are presented. A great many pictures are taken from the student's cockpit, so that during the descriptions of various evolutions, the reader sees from the student's viewpoint the positions of the plane's nose and wings in relation to the horizon.

Special chapters on air-commerce regulations, acrobatics, forced landings, cross-country flying, aërial navigation, night flying, and other "advanced" subjects should make the book prove fully as valuable to the experienced civilian or military flyer as to the

flight student under instruction, or to his instructor. A unique feature is that the author has not presented "seaplane training" as a subject distinct from "landplane training." Throughout the various chapters he has paralleled the two, showing by discourse, diagram and illustration the differences, where they exist.

Lieutenant Studley is to be congratulated on giving to the service and to the general public a truly practical flight-training manual that will prove of great assistance to anyone interested in any way in the flying of airplanes. It may be remarked further that, if given sufficiently wide distribution, and if every flyer of short or of long experience will take to heart the author's reiterated precepts and cautions, the book will assist tremendously in cutting down the number of deplorable and avoidable aviation accidents.

Practical Flight Training is not so much the result of Lieutenant Studley's personal experience and opinion, as it is in fortunate form the concensus of opinion of all pilots thoroughly experienced in flight training.

BASIC PRINCIPLES OF AIR WARFARE.

By "Squadron Leader." London: Gale and Polden, Ltd. 1927.

REVIEWED BY LIEUTENANT COMMANDER G. R. FAIRLAMB, JR., *U. S. Navy*

Every student of warfare should read this book. The author is an officer of the Royal Air Force. To naval officers and especially to naval aviators the subject is of prime interest. The writer handles the subject so well—has so many thought-provoking ideas—that a close study of the book will be time well spent.

The viewpoint is, of course, that of a third service—the air force, but it is the most sane and logical presentation of this viewpoint that the reviewer has ever seen expressed. In view of the recent efforts to absorb the Navy's aviation into an independent air force, the idea of "Squadron Leader" that "necessity for the control of certain air units by the fleet and the army for specialized work . . . . has been shown to be vital if they may rely on a strong and efficient air arm to enable them to carry out their functions effectively," will prove readily acceptable ammunition for the Navy, if ever again the attempt is made to remove its aviation to other jurisdiction.

The viewpoint is also essentially British and the author makes particular reference to the needs and problems of the empire. Further, it is apparent that the author's experience has been confined to the army and the air force, or perhaps to service in the latter alone; and despite the very deep study which he has quite evidently given to naval warfare, this does not compensate for lack of naval experience. Hence, his naval readers will not agree with all of his conclusions. However, a résumé of the book will best suffice to indicate wherein "Squadron Leader's" ideas clash with current American naval conception of air warfare at sea.

There is a keynote accompanied by a strong overtone, which faithfully sounds throughout the 133 pages. "Directly or indirectly, the object of air warfare must in the first instance always be the security of air superiority. My purpose is to show that this will only be achieved and can only be achieved by (air) fighting." This is the overtone. Coöperation between the three services—this is the keynote, forcefully exploited by the following points:

(a) The primary object of war remains as formerly—destruction of the enemy's armed forces. Many pages are devoted to refuting the modern idea of enthusiasts that the next war can be won by loosing an aërial offensive against the civil population.

(b) Neither the army nor the navy can perform their war functions (which, since the air force is conceded to be unable alone to gain a decision against civilized nations, are considered to be as important as they ever have been in the past) without first obtaining air superiority.

(c) This being so, the air force should provide air superiority for the army and navy by (1), providing them with the necessary ancillary aircraft to perform their functions; and (2), defeating the enemy air force.

(d) Therefore the strategical employment of the three services should be interlocked so that each contributes to the attainment of the common objective.

In stressing the necessity for coöperation and mutual understanding between the three services, the author decries the use of the term "independent," in relation to the air force, and declares that none of the services should be employed or even thought of in-

dependently of the others. The American reader may be pardoned for wondering at this point whether or not the wish for co-operation is father to the thought that none exists between the Royal Air Force and its sister services.

Employment of the air force is ably handled in a separate chapter. Here, as in other parts of the book, is given the conception of aircraft constituting a single combatant force and acting as such in co-ordination with the army and navy—the picture so frequently painted, so ardently applauded by some, condemned by others, and only dimly visualized and understood by most, because of the confused details presented when viewed from its many different angles. But those who are convinced that the demerits outweigh the merits can at least appreciate the merits, and the honesty and sincerity of the viewpoint which expresses them. Especially it is noted that the recognized principles of land and sea strategy and tactics apply to the air; that air effort to be effective must first secure superiority and thereafter be sustained. The employment itself will be dictated by the enemy air strength, relative geographic positions, the nature of the terrain, etc., all of which, together with the general strategic situation and conditions obtaining at the moment, will influence the selection of the objective as well as the tactics. It is emphasized that in all cases the enemy air force must be knocked out by a vigorous and sustained air offensive—that victory through demoralization of civil populations, even if this type of warfare be countenanced, is a chimera.

Interesting points are made as to the power of the offensive, the advantage of the initiative and surprise which accompanies the attacker, etc. Most interesting is the discussion of antiaircraft defense. The success of the defense at London and Paris is cited. "It can be said that raiding and defense grew up together and when the latter had been adequately equipped and organized it proved successful. . . . During the few months of night attacks on our island, the barrage searchlights, guns, and fast scouting craft prevented the majority of enemy machines from reaching their objective. Out of a total of 118 enemy machines that were sent over during the months of September-December, 1917, only thirty-one are reported as having penetrated the defenses of London." Referring to the antiaircraft defense at Paris the success was "even greater." "Within a short period no fewer than twenty-six enemy machines were brought down at night, which had the effect of putting an end to enemy activity in that area." The sound conclusion reached is that assumption of the defensive rôle will be disastrous—that no such thing as absolute denial to enemy aircraft exists, but that nevertheless it appears essential that a well-organized defense consisting of fighter aircraft, antiaircraft guns, and searchlights be available for the defense of vital points and that such defense may be expected to prove efficient in the light of past experience.

Another chapter is devoted to the influence of air power on sea warfare. The naval aviator agrees heartily with "Squadron Leader" that "aircraft have added to the complexity of naval warfare and may well change the application of the principles of naval strategy," but there is only one sentence in the whole book that indicates thought of the employment of aircraft in a fleet battle. "A fleet air arm may be essential to the fighting efficiency of a fleet so long as the aircraft carrier survives . . . and no one will deny that the control of such forces in operations with a fleet at sea must be vested in the commander in chief." But this implies only a temporary control during operations, and furthermore the statement comes after the author has relegated the "stop-gap" aircraft carrier to the rôle of a depot ship for flying boats and seaplanes, and replaced it with a whole fleet of flying boats (not less than 150 for the equivalent cost of one carrier and its planes), which will enhance the fighting value of the navy and simplify the control of sea communications. This partiality for flying boats is because, "aircraft . . . . must be able to carry out their functions independently of their base, using the sea as their natural base from which to operate. This alone will enable them to make full use of their mobility and in addition increase their reliability for operating at sea and give them greater freedom of action." It appears to the reviewer that if ever the flying boat as a weapon of war reaches such a state of perfection, we will have arrived at the point where the navy may be dispensed with entirely.

The author says that the carrier renders aircraft immobile, whereas what he means is that compared to a land airdrome the carrier is inefficient in launching and receiving its brood. From the naval viewpoint, the carrier gives to aircraft mobility plus. Further, after replacing carriers with flying boat squadrons, the author foresees "fighting aircraft alone being carried on all larger type ships." This is the typical landsman viewpoint which only takes into account fleets in action offshore within range of shore-based aircraft, and fails to visualize the air action which will develop in a fleet battle. Of what value in a fleet action against an enemy similarly equipped are fighters? Though employing offensive tactics, the fighter is a strategically defensive weapon—it is wholly offensive-defensive in nature. It would have been more nearly correct for "Squadron Leader" to substitute light bombers, because the picture of combat planes chasing tails and shooting each other out of the sky for no other reason than that no other air targets in fleet battle would be offered, is absurd. The reviewer diverges widely from the author on several items in this chapter.

Possibly an army or a marine officer may find fault with "Squadron Leader" here and there in the chapter devoted to the influence of air power on land warfare, but this chapter rings perfectly true to one who lacks first hand experence in the army. It is noted, however, that no mention is made of the army commander having control of the ancillary aircraft needed for the army. We wonder if the omission is intentional. It may not be, and the reviewer is inclined to think that it is not, for in the first place it is not consistent with conceding command to the naval commander, and in the second place the author has too thorough an understanding of the value of unity of command for us to believe that he would deny this to an army commander. An interesting conclusion of this chapter is that armies must develop cross-country traction to increase their mobility, and must break away from present dependence on fixed lines of communications, such as railways and highways.

In conclusion, it appears that the reviewer has disagreed with the author more often than otherwise, but such is not the case. It seemed advisable in reviewing for naval readers to stress the few points of disagreement, which are confined almost entirely to certain of the author's ideas of naval air warfare. Finally, it is not clear whether the author would have the ancillary aircraft for the specialized functions of the army and navy merely provided by the air force or to be part and parcel of those two services. If the former, we disagree again; if the latter, it is one more point of agreement which makes it almost unanimous. In recommending this book to every officer who can get hold of it (through the Bureau of Navigation) the following quotation speaks for itself: "The importance of aircraft only accentuates the necessity of thinking in terms of air warfare to solve or elucidate a future naval problem."

AËROBATICS—A SIMPLE EXPLANATION OF AËRIAL EVOLUTIONS

By Major Oliver Stewart, A.F.C. New York: Isaac Pitman and Sons. 1928. $1.50.

Reviewed by Brockholst Livingston

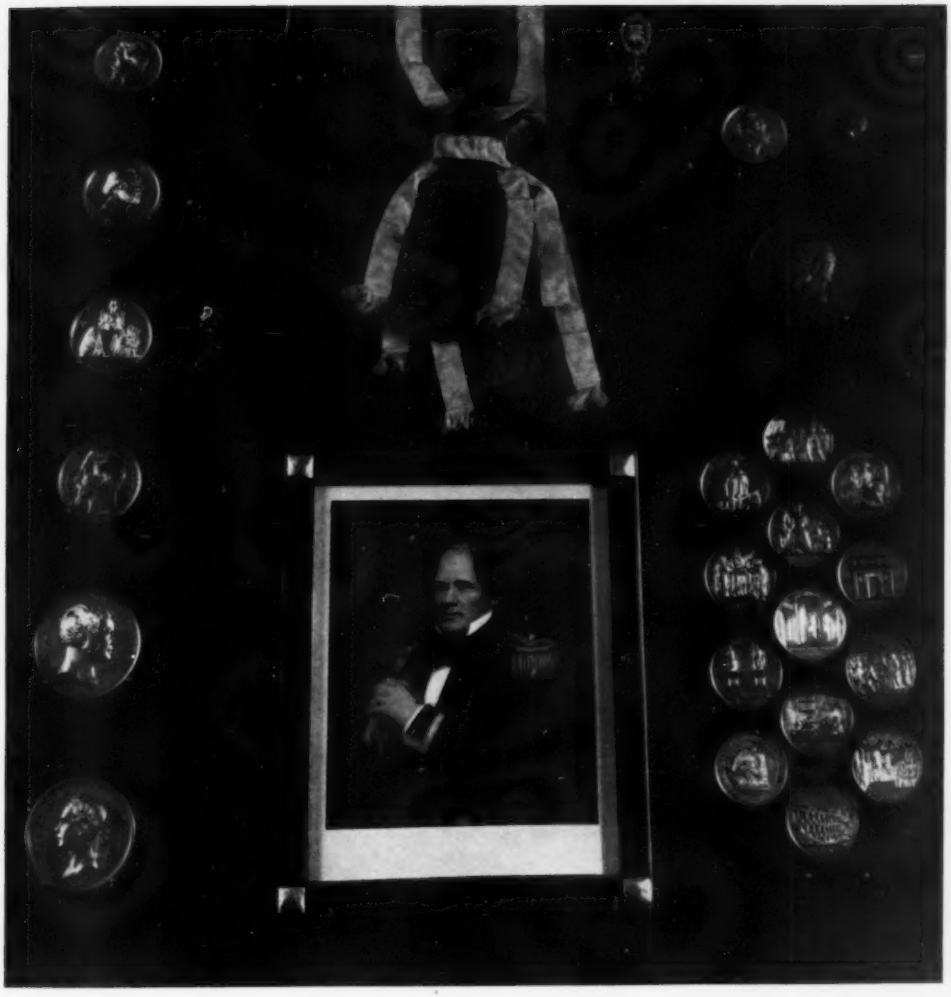
An interesting, valuable and, what is even more, an inexpensive book has been written by Major Stewart. In his preface he states:

> This book describes how to accomplish the various maneuvers known as "stunt" flying or aërobatics, which are made use of not only as providing a spectacle at aërial displays, but also in warfare and in cases of emergency such as sudden engine failure when it may be necessary to effect a safe landing in a confined space.

While the book may be read in an hour, one regrets that some of the matter is so briefly treated and would gladly have spent more time on a subject so important as the author and all authorities state it to be.

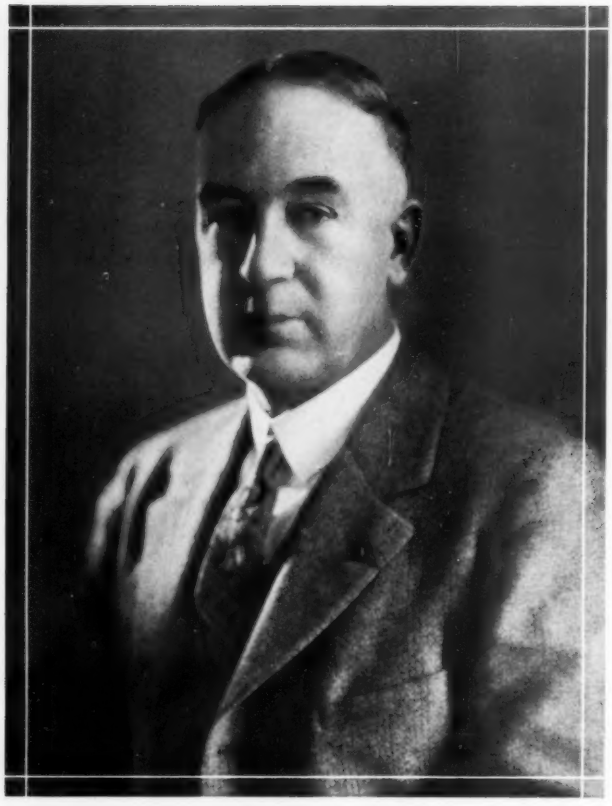
The subject is handled well in that the more common "stunts" are treated separately under such chapter headings as "The Loop," "Rolling," and, "Flying Upside-down." The possibilities of new evolutions are discussed and there is a chapter devoted to "Emergency Aërobatics." The type of machine best fitted for aërobatics is left unsettled by stating that the ideal had not yet appeared.

Probably none of the subject matter is new—especially to fliers—but concentrated into one little book it should prove useful to anyone interested in "stunt" flying from the angle of profession or necessity.



MATTHEW FONTAINE MAURY : PATHFINDER OF THE SEAS

This photograph of Matthew Fontaine Maury, the distinguished naval officer and oceanographer, hangs in the National Museum, together with some of the medals and decorations conferred upon him. He was made a knight of the Order of Dannebrog by the King of Denmark in 1856; in the year following, a knight of the Order of St. Anne by the Czar of Russia and a commander of the Legion of Honor by the Emperor of France. In 1859 he had conferred upon him the Order of the Tower and Sword by the King of Portugal. Between the years 1854 and 1859 gold medals were conferred upon him by Norway, Sweden, Prussia, Bremen, Holland, Austria, Sardinia, and France, and in 1860 the Pope sent him a set of thirteen beautiful silver medals. He was awarded the Medal of Honor for his charts at the Paris Universal Exhibition of 1855. There were two gold medals from Prussia: one a medal designed for distinguished works of science; the other the Cosmos Medal, struck by the King of Prussia to honor Humboldt upon the publication of his *Cosmos*, and given to Maury because of the warm personal friendship that had long existed between the two great scientists.



Distinguished Naval Academy Graduates in Civil Life

Captain Ralph Earle, U. S. Navy (Retired)

RALPH EARLE was born in Worcester, Massachusetts, in 1874. After attending the Worcester Polytechnic Institute, he entered the Naval Academy, graduating in 1896. During the Spanish War he served on the *Hornet*, participating in the battles of Manzanillo, June 3 and July 18, 1898, and on the *San Francisco* and *Essex*. While attached to the *Missouri*, 1903 to 1905, he was commended by the President for bravery in connection with the flare-back and fire in the after 12-inch turret, where five officers and twenty-seven men lost their lives. In 1914 he commanded the *Dolphin*, participating in the occupation of Vera Cruz, Mexico. He served two tours of shore duty at the Naval Academy, one as the head of the Department of Ordnance and Gunnery.

Earle, then a commander, was appointed, in December, 1916, chief of the Bureau of Ordnance of the Navy Department, with the rank of rear admiral, the youngest officer who had ever held that position. Under his supervision the bureau successfully carried out its tremendously increased responsibilities in connection with the World War, including the design and supply of new ordnance material, antisubmarine devices, the arming of merchant ships, etc. Notable was the initiation and completion of the North Sea mine barrage, one of the culminating steps in the defeat of the submarine; and the design and construction of the 14-inch 50-caliber railway batteries, instrumental in cutting the enemy's main line of communications. He was awarded the distinguished service medal by the Navy Department and by the War Department.

After the War Captain Earle commanded the *Connecticut*, and in 1921 became chief of staff of the Control Force. In August, 1925, he applied for retirement after thirty years service, to become president of the Worcester Polytechnic Institute, one of the oldest and most distinguished engineering colleges in the country. Under his administration extensive improvements have been inaugurated, including a comprehensive building program, the beautifying of the campus, the advancement of athletics, the strengthening of the faculty, and the addition of new courses, including one in aëronautics.

SECRETARY'S NOTES

Cruisers

This month our illustrations feature cruisers. We show pictures of practically all of our ten actual cruisers. We also show pictures of some of Great Britain's modern cruisers.

If there is any person who does not know of the cruiser situation in the United States, it is because he does not read or else he blinds himself to facts, for the subject has been thoroughly discussed.

The table below lists the cruisers of the British and American navies; the data is taken from English authorities. The pifflebund will attempt to mislead the public by telling them that the list does not include our 1905-type armored cruisers of the *Pittsburgh* class, but they will not tell you that Great Britain has retired this obsolete class ever since the Battle of Jutland, where they could not keep clear of the enemy battleships.

The United States has kept the ships of this type, and even ships that fought in the war with Spain, in commission as station ships and flagships in lieu of anything better. In war they would be floating coffins. But the pifflebund will drag them out of their well-earned retirement and proclaim them to be modern cruisers. The modern cruiser can cruise twice as far, can shoot twice as far, and has from ten to twelve knots more speed than the 1905 type; but this does not deter the professional propagandist—he does not care for facts.

The propagandist will claim that the United States is starting an armament race; anyone knows there can be no race unless there is someone to race with and the United States is not close enough to be in the running.

CRUISERS (From *Jane's Fighting Ships*, 1928)

GREAT BRITAIN					UNITED STATES				
WASHINGTON CONFERENCE TYPE									
Building									
Class	*No.*	*Tons*	*Guns*	*Speed*	*Class*	*No.*	*Tons*	*Guns*	*Speed*
York	6	8,400	6–8″	31½	Augusta	6	10,000	9–8″	35(?)
London	4	10,000	8–8″	32	Pensacola	2	10,000	10–8″	33(?)
Norfolk	4	10,000	8–8″	32					
Total	14				Total	8			
Note: All of *York* and *Norfolk* class to be laid down by 1930.									
Built									
Australia	2	10,000	8–8″	31½					
Kent	5	10,000	8–8″	31½					
Birmingham	4	9,800	7–7″.5	30½		0			
Total	11				Total	0			
Note: *Birmingham* class authorized before 1920, but of type adopted by Washington Conference.									

PRE-WASHINGTON CONFERENCE TYPE

Built since 1916

Class	*No.*	*Tons*	*Guns*	*Speed*	*Class*	*No.*	*Tons*	*Guns*	*Speed*
E	2	7,100	7–6″	33	Omaha	10	7,500	12–6″	33.7
D	6	4,700	6–6″	29					
Carlisle	5	4,190	5–6″	29					
Ceres	5	4,190	5–6″	29					
Caledon	3	4,120	5–6″	29					
Adelaide	1	5,560	9–6″	25					
Dunedin	2	4,700	6–6″	29					
Total	24				Total	10			

Built Prior to 1916

With speed *in excess* of battleships

Class	*No.*	*Tons*	*Guns*	*Speed*	*Class*	*No.*	*Tons*	*Guns*	*Speed*
Centaur	2	3,750	4–6″	29	Salem	3	3,750	4–5″	25
Cambrian	6	3,750	4–6″	29					
Caroline	3	3,750	4–6″	29					
Birmingham	2	5,440	9–6″	25.5					
Dartmouth	1	5,250	8–6″	24.5					
Brisbane	1	5,400	8–6″	25.5					
Total	15				Total	3			
Note: All built since 1911					Note: Built in 1907				

TOTAL TONNAGE

Building.....14 ships—130,400 tons	Building..... 8 ships—80,000 tons
Already built....50 ships—290,000 tons	Already built.13 ships—86,250 tons

In addition Great Britain has 18 destroyer leaders, 1,600–1,800 tons each, mounting five 4.7-inch guns with speed from 31–36 knots. The United States has no ships of this type.

Home Again

Twenty years ago, February 22, the fleet returned to Hampton Roads, Virginia, having circumnavigated the world. It was a hard cruise, but it accomplished wonders for the efficiency of the fleet. President Roosevelt afterwards claimed that this cruise was the most important peace accomplishment of his entire term of office as President.

In spite of pessimists, in spite of difficulties, the fleet returned in better condition than it started.

Wives, sweethearts, relatives, and friends greeted the fleet on its return, the President reviewed it, and the long trek was over.

The Pictorial Log of this cruise, 280 pages of engravings made from pictures taken twenty years ago and modern pictures of the ports visited, will be out some time this month and will be promptly mailed to those who have already ordered copies. The price is $3.50 per copy ($3.00 to members and associate members).

Once you have seen the book, I am sure that additional copies will be ordered for presents to your friends.

Education vs. propaganda

We quote below a discourse on education and propaganda, taken from *Pied Pipings by the Shop Philosopher,* printed in a limited edition by the Williams and Wilkins Company, of Baltimore. The article is so apropos at this time.

"There is much confusion of thought between education and propaganda. All uplifters strut their stuff under the label of education, and educators more often than not spout forth propaganda rather than education. The undiscriminating fail utterly to note

any difference, and I have even heard those who clearly ought to know better, speak in terms which indicated that they regarded the two as all but synonymous. This thing needs clearing up.

"Education *per se* concerns itself solely with facts. It passes out information concerning facts. It has little to do with interpretations of fact, with conclusions. It merely recites that such-and-such an interpretation, conclusion, conjecture, theory, has been propounded by so-and-so; or that such-and-such is a possible (or an impossible) conclusion. Education does not inculcate a doctrine, formulate a cause. The force of etymology should be considered; *educo, to draw out*—that is to say, to draw out and extend the mind of him who is being educated. Something *pulled out* of the subject.

"Propaganda concerns itself wholly with conclusions, theories, interpretations. It refuses parley with any facts except those favorable to the conclusion being propagated. Its entire motive is inculcation. It aims to reproduce in the mind of the subject the conviction or theory or whatever, in the mind of the propagandist. Something *put into* the subject.

"Education and propaganda, so far from being all but synonymous, are diametrically opposed. The *matériel*, the method, the motive, the aim, the result—all are at opposite poles. They have, in fact, very little in common. This thing is now cleared up.

"I cannot but regard propaganda *per se* as essentially vile, and consequently the effort of the uplift as pernicious, disregarding the merits or demerits of the particular idea sought to be propagated. For propaganda is bound to be something less than honest. It is bound to be partisan, bound to conceal part of the story, bound to be, in some degree, hypocritical. Its whole idea is to make out a case and make converts. Consequently it narrows the field of vision of a considerable segment of the populace, and gives certain people of quite absolutely no importance whatever a sense of importance and wisdom which is damnably exasperating. Yet after all, if they find amusement in this way, I cannot bear to deny them. Doubtless it keeps them from doing things still more unsocial and annoying."

Consistency, a jewel

And it is getting rarer. What we can't understand is how the same type of person that demands more and more appropriations for prohibition enforcement, that argues that the law will not be observed without a rigorous enforcement, that force and force to the utmost must be employed—that same type of person will smooth down his ruffled feathers, put on a rapt expression, and blandly tell one and all that in international relations brotherly love will solve all problems and force is not needed!

We must use force with our own people and love abroad.

Imperialism

We read in the papers that a very distinguished English army officer, speaking at the annual "Pilgrims" dinner, said that the United States was rapidly assuming the imperialistic attitude of Germany in 1914, citing our proposed cruiser program as evidence.

In view of the fact that Great Britain has the largest empire known to history, and in view of the fact that her cruiser equipment is three times that of the United States, we find the specification proved in part; proved except the word "United States," for which word we substitute the word "Great Britain," which word is proved.

Ship show, 1928

At the annual Naval review recently held in Japan, England exhibited three of her eleven completed 10,000-ton cruisers while Japan showed the one she had just recently completed. The United States, not having any of this type completed, showed a cruiser of her 1904 type. It was interesting as a relic and showed how long a ship can float, in peace times.

Narrow-mindedness

When General Fries speaks his mind about those propagandist organizations and professional pacifists who are deliberately deceiving the public and misleading the well-intentioned seekers for peace, the academies at West Point and Annapolis are accused of lack of cultural education with consequent narrow-mindedness of their graduates.

That is old stuff. There is no use in entering into a controversy on that subject but it might be well to remark in passing that both academies have supplied their fair share of men distinguished in the cultural, scientific, and business worlds.

As to narrow-mindedness, almost anyone who has a definite purpose in life is narrow-minded. Otherwise, he wouldn't succeed in his task.

The doctor is narrow-minded when he recommends certain preventives to forestall epidemics; the judge is narrow-minded on the bench, the fireman is narrow-minded when he trys to prevent unnecessary fire hazards; the business man is narrow-minded when he trys to run his business efficiently.

George Washington, John Paul Jones, Grant, Lee, Farragut, Dewey, and Pershing were narrow-minded, but they did their jobs well, and that was what was wanted.

The truly broad-minded person is the one who has no responsibility; anything he says or thinks will not cost him anything. It takes the broad-minded man without a dollar in the bank to tell the Secretary of the Treasury how to run his business; or the pacifist to tell the country its needs in national defense, for the true pacifist will claim exemption from military service when war comes.

"By their works ye shall know them."

Never too late to learn

At the anti-cruiser-program buttonhole dinner recently held in Washington, D.C., one of the learned speakers suggested that, in lieu of building more cruisers, the United States should double the crews of our ships, thereby doubling their efficiency! Why not cut each ship in two, thereby doubling the number?

NOTE: A buttonhole dinner is one where each diner earns his food by buttonholing a legislator. The buttonholer is not elected to office but likes to leave that impression on the legislator buttonholed.